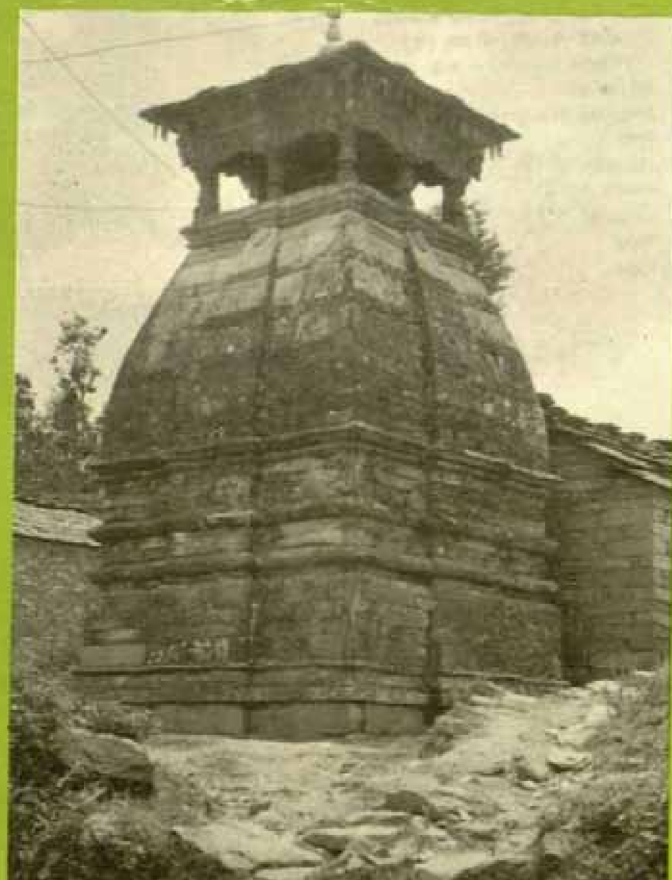
Indian Archaeology

1989-90—A REVIEW









INDIAN ARCHAEOLOGY 1989-90 - A REVIEW

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I Panchavaktra temple, Devli Bhanigram
2 .Terracotta sealing, Adam
3. Terracotta head, Adam
4. Coin, Adam

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PREFACE

I am happy to place this issue of *Indian Archaeology 1989-90—A Review* in the hands of scholars. We are deeply aware of the delay in its publication. Several contributors had to be reminded many times to send material for inclusion in the *Review*. I would like to take this opportunity to request my colleagues in the Archaeological Survey of India, the State Departments of Archaeology and Museums, the Universities, museums and other research institutions whose contributions go into the making of the *Review* to send the material for publication to us well in time and in keeping with the format and style of the publication. This would also help in expeditious publication and continuity and regularity of a scholarly publication, which is seminal, is maintained.

The present issue of *the Review* contains information about the activities in the field of archaeology all over the country comprising of exploration and excavation, epigraphy, numismatics and treasure trove, architectural survey, radiocarbon dates, palaeobotanical and pollen analytical studies, museums, conservation of monuments and sites, archaeological chemistry, archaeological gardens and publication. It also contains information about the work done by the Archaeological Survey of India outside its geographical boundaries. Bulk of the information relates to brief reports on explorations and excavations carried out throughout the length and breadth of the country. Among the excavations carried out by various agencies during the year under review, I would like to mention in particular excavations carried out by the Archaeological Survey of India of the Harappan site at Dholavira in Kutch (Gujarat), unearthing extraordinarily significant architectural features including town planning; at the Harsh-ka-Tila in Thanesar (Haryana), revealing sequence of different historic periods; Adam near Nagpur (Maharashtra) exposing the sequence of remains from the microlithic to the early historic times; at Kolhua in Vaishali (Bihar), having Buddhist remains; at Hampi, an early mediaeval period site and Gundnapur, Kadamba site in District Uttara Kannada (Kamataka) where early mediaeval material dating back to the fifth-sixth century have been brought to light. Of the important excavations carried out by various State Governments, mention may be made of Thotlakonda, a Buddhist monastic site in District Vishakhapattanam (Andhra Pradesh), and Ambari, a historical site in District Kamrup (Assam). Among the major excavations work done by various Universities may be mentioned the chalcolithic site of Maner (Bihar) excavated by the Patna University; Harappan sites at Kuntasi (Gujarat) excavated jointly by the Deccan College, Postgraduate and Research Institute, Pune and Department of Archaeology, Government of Gujarat; Nagwada (Gujarat) by the M.S. University; Chalcolithic site at Mangalkot in Burdwan (West Bengal) by Calcutta University; Purola in District Uttar Kashi (Uttar Pradesh) by the H.N. Bahuguna Garhwal University. Apart from various conservation works throughout the

length and breadth of the country, the Survey also continued major work of structural conservation and chemical preservation of the Angkor Vat in Cambodia. The Survey also completely reorganized the Central Armed Forces Museum at Luanda (Angola).

The publication of this *Review* is the result of the joint effort of Shri B.M. Pande, Director (Publication) of .the Headquarters office of the Survey and his colleagues namely Shri C. Dorje, Superintending Archaeologist, Dr. Arundhati Banerji, Deputy Superintending Archaeologist and Shri A. Jha, Assistant Archaeologist, in the Publication Section. I would like to place on record my thanks to them and also to M/s Bengal Offset Works for the printing of this publication.

NEW DELHI
28 December, 1994

DR. S..K. MAHAPATRA

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INDIAN ARCHAEOLOGY 1989–90– A REVIEW

I. EXPLORATIONS AND EXCAVATIONS

ANDHRA PRADESH

1. EXPLORATION IN DISTRICT CHITTOOR.— The Directorate of Archaeology and Museums, Government of Andhra Pradesh, reported the discovery of a temple of Somesvarasvami, datable to the thirteenth-fourteenth century and temple of Venugopalasvami belonging to the late Chola and early Vijayanagara period respectively in the village Vijalapuram in Rama Kuppam Mandal of the district.

2. EXPLORATIONS IN DISTRICT EAST GODAVARI.—The Directorate of Archaeology and Museums, Andhra Pradesh, reported the discovery of temples at Ramdurgam, Raghudevapuram and Gangalakudur in the district. Of these Anandesvara temple at Gangalakudur was found to be unique as it contains a *Siva.-linga* made of Dachapalli limestone and has an Ardhanarisvara carved on it. The temple has been dated to *circa* fifth century AD.

3. EXPLORATIONS IN RAJAHMUNDRY LATERITIC ZONE, DISTRICT EAST GODAVARI. — K. Thimma Reddy and P. Vijaya Prakash of the Department of Anthropology; Andhra University, Waltair, carried out archaeological explorations in the Rajahmundry lateritic area on the low lying hillocks on the left side of the Godavari river near Rajahmundry and brought to light evidence ranging from the mesolithic to medieval times.

Vemagirigutta (18°45' to 18°50' N; 81°45' to 81°50'E), a small village located about 10 km south-east of Rajahmundry town or about 4 km south-east of Dhowleswaram barrage where the low lying hillocks are being subjected to quarrying have exposed archaeological material. Trial excavations in three localities revealed material belonging to the mesolithic, meolithic and megalithic periods.

The stratigraphy at Vemagiri is recorded as follows. The topmost layer is humus whose thickness is 15 cm. The second layer below the humus has the thickness of about 37 cm. It has occasionally yielded potsherds. The third layer is the compact soil layer which has a thickness of about 17 cm. It underlies the loose soil. Potsherds, waterworn pebbles and microliths are recovered from this layer. The pottery includes thin fabric as well as coarse, gritty red ware, red and black ware, buff ware and black ware. The concrete soil layer is the bottommost layer laid on bedrock. It has a thickness of about 6 cm. In this layer, two dishes and scores of potsherds were exposed. Also at a depth of 72 cm a broken bone piece of tibia was obtained.

Mesolithic evidence comprised of geometric microliths made of quartz and chert recovered from the hill slopes.

The neolithic material comprised of the broken ground and polished axe pieces, ribbon blades and cores, besides pottery. The pottery is dominated by a coarse red ware besides thin red, red slipped and red and-black wares. A good number of fluted cores and beads on semi precious stone and a polished broken axe made on dolerite was found.

The megalithic remains at Vemagirigutta comprise of red ware and Black and red ware, the pottery shapes being globular pots, bowls and large pots. The large size pots resemble funerary pottery.

4. EXPLORATION IN DISTRICT KHAMMAM.— The Department of Archaeology and Museums, Andhra Pradesh, discovered a megalithic site covering an area of two to three km comprising dolmens, dolmenoid cist burials with and without stone circles, the burials containing anthropomorphic figures and cruciforms depicting male and female figures; a *trikuta* temple of the Kakatiya period at Kothulanaduma; and extensive site covering an area of about 20 acres containing evidence of occupation during neolithic and megalithic periods; a Siva temple at the village Madigunta in Chintapalli Mandal belonging to the eleventh-twelfth century; an extensive Buddhist site at Gopalapatnam village near Tuni containing traces of brick structures and votive stupas, remains of *viharas* and broken *chhatra* pieces; four rock-cut caves, perhaps of Buddhist affiliation about one kilometre north-east of Bhumikonda; and foundations of a *maha-stupa* and some votive stupas at Veeralametta.

5. EXPLORATION IN DISTRICT KRISHNA.— J. Vara Prasad Rao of the Hyderabad Circle of the Archaeological Survey of India.[1] found during the course of exploration of early historical mound at Meduru and medieval sculptures at Gollapudi, both in Tiruvur Taluk.

6. EXPLORATION IN DISTRICT KRISHNA-The Department of Archaeology and Museums, Andhra Pradesh, carried out exploration in the District and brought to light early historic site respectively in village Kadavakollu in the Vuyyar Mandal, between the village G. Madavaram and Thimmapuram in the Erlapadu Mandal and in the village Ghantasala. At Kadavakollu, remains ranging from the neolithic to the early historic periods were noticed while at the site between G. Madavaram and Thimmapuram, large quantity of early historic black and red ware and black ware were noticed. At Ghantasala, sherds of red ware and brickbats were recovered from a 15 m high mound. Sherds of medieval grey pottery were noticed in the Rayapudi village in Tullur Mandal of the district.

7. EXCAVATIONS AT SRISADLAM, DISTRICT KURNOOL.— As a part of the research programme on culture and history of Srisailam (16° 65' N; 78° 52' E), trial excavations were conducted at three find

[1] The Archaeological Survey of India is referred to in the following pages as the Survey'.

spots, i.e. Mekala Banda, Vibhuthimatham and Z.P. High School by K. Thimma Reddy, D. R. Raju, N. Chandra Mouli of the School of History, Culture and Archaeology, Telugu University, Srisailam campus in order to recover the material remains and to assess the historical background of Srisailam.

Chance discovery of potsherds in the surface soil quarried for the construction of school at Mekala Banda led to this trial excavation. A trench measuring 3 x 2 m was laid 2 m away from the quarry pit. The deposit has a thickness of about 35 cm where boulders and bedrock are met with. Wet sieving of the soil resulted in the discovery of a large number of potsherds, beads, bangle pieces, copper coins, silver and copper objects, small votive stone *Siva-linga* etc. A trench measuring 3 m x 2m was laid behind Vibhutimatham within the compound wall. Loose soil and patches of ash were continuously encountered upto 45 cm depth. Large number of potsherds, including few with spouts were found. The potsherds are identical to those found at Mekla Banda. Beads, bangle pieces, copper coins, iron objects, a small votive *Siva-linga* (broken) were also recovered.

The excavation also brought to light an underground passage running to a length of 7m and opening into a rectangular chamber measuring 1.40 x 1.55 x 1.80 m. The side walls and the roof of this chamber are made up of dressed stone blocks. Iron pieces, possibly used for hanging lamps, few potsherds and bone fragments were also found. The roof of the structure was covered with lime mortar.

To the east of this passage a structure was partially exposed, where a bath with stone-paved floor with an outlet and a flat circular stone grinder were found. This appears to be a place for residence while the underground passage might have served as a place for meditation. The mound-like feature behind Z.P. High School is one of the many of its kind observed at many places around the temple. Some uniform features are visible in all the cases—a huge outer wall roughly rectangular, enclosing at its centre a square/rectangular mound-like structure. In some cases, there are two outer walls. With a view to understanding the pattern of these mound-like structures, the one behind the Z.P. High School was taken up for excavation.

The mound is covered by thorny thickets and bushes. Some portions of it were quarried for mud by the local people. Excavation was carried out at this mound, located about 50 m to the north of the high school. Another wall enclosing the mound was traced about 5 m away from the outer wall. The inner wall measures 65 m east-west and 7.5 m north-south, and 5.5 m west-east and 9.0 m north-south, enclosing a rectangular chamber with partition and another structure containing three chambers. This wall is made up of undressed stone blocks. The rectangular chambers enclosed by the second inner wall, measure 5 x 3 m with a partition and steps leading to the chambers. In front of these rectangular chambers and to the left of the steps is another small square pit lined with stone slabs measuring 30 cm x 12 cm. Two stone pillar bases on either side of the entrance were also exposed.

Further excavation of the mound measuring 8 m x 8 m revealed three rectangular chambers opening into a common verandah, approachable by an entrance and steps from the northern side.

The chambers measured 1.45x1.20m; l˙30xl.20m; l.30x1.20 m respectively. The entrances of these chambers measured 0.50 m each. The entrances are narrowed down by raising two rectangular stone blocks on either side. In the central chamber, facing north, were found four fragments of stone sculptures — one of a male deity, Virabhadra and another of a female deity.

The rectangular open space in front of the chambers was also excavated where remnants of a wall running parallel to the rectangular chambers and connected to the outer wall of the mound extension was found.

Excavation of the mound has shown that it was *a matha,* with two residential rooms and three meditation chambers all enclosed by two walls made up of undressed stone blocks and boulders.

The pottery recovered at Mekala Banda, Vibhutimatham and the High School site include grey colour coated .ware, black ware, red ware, red-slipped ware and dull white ware.

The pottery, in general, is fine-grained, well-levigated and well-burnt. However, a few sherds are thick and coarse grained with clearly visible sand particles. The types fall under globular pots, with wide as well as narrow mouths of different sizes, bowls, dishes, *lotas* and lamps. Cups with round base were also found. The occurrence of spouts revealed the use of spouted vessels. Some vessels have thick and long neck while a few are found with constricted neck. Two pieces had lime coating on both the surfaces. In all, twenty-one coins were recovered from Mekala Banda, six from Vibhutimatham, forty-seven from the High School site while ten were from the surface collection of the Chenchus in the Srisailam valley. The coins have the following symbols on them: a deity with eight hands (Mahishasuramardini), elephant, wild boar, *Siva-linga,* bull, etc. Some of the coins have legends in Persian.

Among other objects were a hundred and one beads of camelian, glass, steatite, chalcedony, etc.; copper talismans, rings, fresh copper foils with Telugu letters and numerals, etc.; small votive *Siva-lingas,* discs of varying sizes, sculpture fragments, grinders, etc., and fragments of bangles made of shell, steatite, glass, camelian. etc.

8- EXCAVATIONS AT THOTLAKONDA, DISTRICT VISAKHAPATNAM.— In continuation of last year's work *(Indian Archaeology 1988-89 - A Review.*[1] p.5), excavations were resumed at Thotlakonda, near the Mangamaripeta village in the Bheemili Mandal, by the Directorate of Archaeology and Museums, Andhra Pradesh. Work was continued in the remaining portion of the Vihara No. IV in Division 30 which had been partly exposed last year. This Vihara (30.70 x 2.40 m) with a 2..10 m wide common verandah consists of twelve cells, access to which was through circular stone steps outside the verandah directly in front of each cell. One of the steps, in front of cell no. 9 had a much worn-out Brahmi label alongwith *svastika* marks. On the extreme southern end of the vihara is a stone-paved revetment prefaced by a big flat stone step probably indicating a side entrance to the vihara. A broken terracotta figurine *in pralambapada* posture resembling the figurines in early historical

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'This publication will hereafter be referred to by the year only

context at Dhulikatta and Peddabankur sites in Kareemnagar district and Roman type of amphorae with globular body in red ware were also found in the cells of this vihara.

About 1.30 m east of Vihara No. IV, another small four celled vihara (Vihara No. 8) facing the pillared congregational hall was partially exposed. The northern most cell of this vihara is rectangular in shape while the other three cells are square on plan. Entrances of these cells are yet to be located.

Excavations in Division No. 41 revealed an imposing rectangular seven-celled vihara designated as Vihara No. VII (21.10 x 6.10 m) with a common verandah facing the central pillared congregational hall. Access to the verandah was provided by a pair of brick-built steps outside the verandah. The moonstone in front of the central brick steps bears a badly abraded Brahmi label inscription.

This vihara consists of two broad terraces with projected walls to break monotony of the structure right from the foundation to the floor level. The first terrace forms the verandah over which the second terracehaving cells is raised.

All the seven cells of this vihara are more or less equal in size (2.65 x 2.30 m) and are having brick-built benches in various sizes and orientation inside except the seventh easternmost cell. Existence of similar stone benches either for beds or platforms for keeping articles for day-to-day use has been reported from rock-cut caves of Pitalkhora, Nasik and Bhaja.

The eaternmost cell is devoid of any benches but its floor was on a higher level compared to the other cells of the vihara. Near its entrance, a brick with a central hole for insertion of a wooden post was recovered from the debris which may have been intended for fixing up a wooden door. The raised floor and perforated brick near the entrance of the cell suggest that this cell may have served as a bathing room.

The verandah of this vihara, unlike the other vihras of the complex, was raised prominently and extended considrably on either ends of the Vihara.

Excavations in Division 41,42 and 43 revealed a well-planned fourteen celled Vihara No. VI. It is 'L'- shaped on plan having a row of eleven cells running in east-west direction on its longer axis facing north (29.20 x 2.30 m) and three cells running in north-south direction on its shorter axis facing west (11 20 m) flanked by a common two metre wide spacious verandah. Outside the verandah moonstones were placed opposite each cell (pl. IA).

The south-eastern corner cell can be approached only through the third cell facing west (i.e., southernmost cell of the shorter axis running north-south). The sunken floor of this cell appears to be lower than the floor levels of the other cells. Two storage pots having globular body with thickened rim and rounded base were found in a crumbled state at the comers near the southern wall of this cell.

A pair of Roman coins were found inside cell no. 11 near the dislodged entrance stone step. Two more Roman coins were found outside the 11th cell i.e., inside the third cell of the shorter axis from north to south.

The northernmost cell i.e., cell No. 1, of the shorter axis, consists of a spacious bench (0.80 m) probably utilized as a bed-cum-store room. The floor of the cells and the verandah, the walls and the back wall of the vihara were well-plastered with lime.

Stone pathway excavations in Division 33 and 45 in-between the Viharas 6 and 7 revealed a neatly-paved stone pathway (9.80 x 2.35 m) having well- laid dressed stones running in east-west orientation. At the western end of the pathway is a half moon-shaped stone. Connecting this pathway was another pathway paved with irregular flat boulders probably leading to the hall of the viharas, which are yet to be exposed.

On either side of the entrance are two coping stone pillars (0.70 x 0.25 m) bearing lotus medallions on their three visible sides, as the walls of varandahs of Vihara Nos. 6 and 7 are constructed onnecting these pillars. Both sides of the pathway are revetted with well dressed rectangular blocks of stone in a row giving added strength and beauty to the pathway.

Excavations in Division 12 and 22 revealed three votive structures besides two brick-built circular votive stupas (pl. IB)

About 2.20 m away from the southern staircase of the Maha-stupa was a low raised rectangular dry masonry structure (9 .90 x 9 .15 m)constructed with a row of rectangular dressed stone slabs. Over this another square platform (5 x 5 m) was raised at the centre over which was a brick-built circular stupa (2.90 m in diameter) having three intact courses of bricks. These two masonry terraces might have served as lower and upper *pradakshina-pathas.* On the northern side of the structure was an entrance towards the southern staircase of the Maha-stupa. A pair of small coping stones was on either side of the pathway which bad in front a half-moon-shaped step arranged with flat boulders.

A broken pillar was noticed on the northern wall of the square platform. In front of it, on the north-eastern comer, were found broken pieces of a cup-shaped stone trough having a Brahmi label inscription on the rim over its flat surface, which was perhaps a donatory inscription.

Broken remnants of a stone votive stupa having three separate blocks, viz., broken peices of a pedestal, *amalaka* and stupa were discovered on the western side of the platform. Mutilated Buddha *padas* and miniature figure of Muchilinda Naga are the important finds recovered outside the south-eastern wall of the structure (pl. DA).

A 0.50 m wide drain built of cutstone slabs having a thick lime floor was noticed at a distance of 0.75 east of the above structure. It started abruptly at this low-lying area and further extended towards the slopy edge of the hillock. The space between the drain and wall of the rectangular platform was paved with flat stone boulders to serve as revetment for these structures as well as to facilitate the draining away of water from the structure.

About 1.70 m away from the above rectangular structure, another dry masonry structure having stallete or cruciform plan akin to *sarvatobhadra* design, was found. It was raised with a row of rectangular cutstone blocks. At present only two stone courses are extant. The floor over this was

plastered with thick lime mortar. On the northern edge of the structure a mutilated fragment of Buddha *pada* was recovered.

About 0.90 m away from the southern wall of the rectangular structure and 2.50 m from the structure measuring 7.10 x 6.00 m. On its western part traces of another square stone platform (2.15 x 2.15 m) could be seen. A number of dressed stones having blunt and smoothened edge, well-dressed stone slabs, slabs depicting upraised lions and floral motifs were found in the debris. Moreover, a number of broken and intact *Buddha padas* were discovered in this rectangular platform on the eastern side. This platform has a stone step abutting it. A pair of small moonstones were also seen amidst the stone pathway leading to the stone step, which suggests that the entrance proper for the structure must have been existed right from the pillared hall, passing through the stone railing to the square platform. A flat flooring stone bearing *svastika* symbol was seen lying on the western side of the structure. All the above evidences suggest that the structure to be a raised ornate platform housing the Buddha *padas* under worship.

In the earlier season, a row of three votive stupas were exposed on the north-south side of the Maha-stupa. On continuation of excavations in this division, two more brick votive stupas and (2.30 m 2.90 m in diameter) in the same alignment were brought to light. The fourth stupa built just by the side of the right wall of the apsidal *chaityagriha* has three courses of bricks intact. In the fifth stupa, built close to the western wall of the rectangular stone platform prefacing the stone railing, two courses of bricks were found intact.

Chaitya: Excavations in Division 21 brought to light a circular brick-built stupa *chaitya* (11.30 m dia.) with a rectangular platform (4.30 x 2.30 m) prefaced by a half moon-shaped step. The thickness of the *chaitya* wall is lm. Four stone pedestals having sockets for insertion of wooden posts for the roof of the central stupa were placed on the four comer points of the *chaitya*. The stone pathway which was exposed earlier to the north-east of Vihara No. 3 continued and joined with platform of this *chaitya* on its western side. There is another stone pathway starting on the eastern side of the step of the stupa *chaitya* which may probably connect the congregational hall.

The foundation of the *chaitya* is very much disturbed and portions of its eastern flank are missing. No structural remains of the stupa at the centre could be traced. Basing on simple plan and architectural construction this *chaitya* could be considered as one of the earliest religious structures of the site.

The pottery from the area consists mainly of red, black and black and red wares. Red ware is the dominant pottery and constituted about 90% of the total assemblage. The decorations over the pots are ropes, chevrons, grooves around the body, etc. The important forms are storage pots, vases, shallow conical and miniature bowls, Roman type sprinklers, etc.

Besides, stucco forms having floral, full lotus and half-lotus medallions (pl. IIB), grooved and perforated tiles, specially outside the Vihara No. 5; one broken terracotta figurine in *pralambapada* posture with intact hand resting over the knee in Vihara No. 4; four Roman coins from Vihara No.

6; broken Buddha *padas* near the votive stupas were found.

A pitcher-like stone pot having deep chiselled mortice for keeping a wooden pole was another important find.

Mutilated pieces of Muchilinda *naga* figures were also recovered near the votive stupas. A slab depicting five-hooded *naga* in-between two pilasters, a slab with coiled body portion of the *naga,* broken panel showing subjugation of Nalagiri episode representing intoxicated Nalagiri elephant lifting a human with its trunk, slabs with squatting lions and floral designs, etc., were the other important sculptural finds.

A broken cup-shaded circular stone trough (0.85 m dia and 0.50 m depth) was recovered at the votive stupa, near the southern staircase of the Maha-stupa. The rim portion was inscribed with Brahmi legend. The trough is well-decorated with a chain of lotus petals below its flat rim.

Based on the evidence of pottery, coins and epigraphy, the site can be dated from the second century BC to the last quarter of the second century AD. The black, and black and red wares show close similarity with the pottery reported from other early historical sites in Andhra Pradesh. The fine fabric of .black ware with well-levigated core, use of fine slip and well firing with metallic sound even suggest a still earlier date of the site.

9. PREHISTORIC SITE, PEDA TADIVADA, DISTRICT VISAKHAPATNAM.— S. K. Rao of the Department of Anthropology, Andhra University, Visakhapatnam, reported the discovery of a site containing evidence of mesolithic-neolithic remains near Peda Tadivada.

The site covers an area of 400 x 300 m. It yielded remains comprising of microliths, fluted cores, mace-heads, ground stone tools, potsherds, etc. Microliths, include a few geometric blades, points, fluted cores, etc. The microliths found mixed in a few exposed patches seem to belong to two cultural stages.

Microlithic bearing mesolithic evidence consists mainly of finished forms and byproducts, the finished forms include blade (95) and flake (17) tools, bladelets (11) apart from simple flakes (47), and cores (19). The finished tools consist of backed blades (3), simple points (15), scrapers (12), borers (3), simple blades (13) and bladelets (11).

Evidence about the neolithic comprises of ground mace-heads, saddle querns and grinders. The raw materials was mainly chert although quartzite was also used. Three ground tools were found out of which two were unfinished while the third-an axe was broken.

ASSAM

10. EXCAVATIONS AT AMBARI, GUWAHATI, DISTRICT KAMRUP.—In continuation of last year's work *(1988-89, p.* 6), excavation was resumed at Ambari under the direction of T.C. Sharma and G.N.

Bhuyan, with the assistance of Minarva Sonowal, Nripen Roy and Dilip Sarma, of the Department of Archaeology, Government of Assam.

Seven trenchs, each measuring 5 metres square, were exposed to an average depth of 2.04 metres below which was subsoil water table; consequently, the strta submerged below it could not be exposed.

The stratigraphy of the site was found to be more or less uniform in all the trenches. It has been divided into several periods which are as follows: Layer 1 a (a thin humus layer), layer 1 (30 cm) and layer 2, yielded cultural materials of the modern (post-Independence and the Indo-British) periods, as attested by coins; layer 3 (32 cm) yielded cultural materials of the late medieval (Mughal- Ahom) period as determined by the green-glazed pottery; below layer 3 was the thick deposit of the early medieval period of which only a part living above the groundwater table is exposed. The exposed early medieval layers demarcated into layer 4 (64 cm), layer 5 (23 cm) and layer 6 (33 cm) are composed of huge quantity of brickbats and reddish-brown earth. These layers yielded antiquities including brick structural remains, large number of sculptures, a huge quantity of pottery and other small antiquities belonging to the period ranging from the ninth to the thirteenth centuries AD. The associated strata of this earlier period had given a C14 date which is 920 ±105 (AD 1030) obtained from a cnarcoal sample collected from a depth of 12 m *(1970-71,* p.4).

The structural remains include at least five to six construction phases of brick buildings with tiled roofs and brick-paved floors, the settlement area being served by a well-planned sewage system made of stone-paved and brick-paved drains, some of which were covered by stone blocks, and a water supply system with the help of ring-wells. At the bottom of the exposed trenches embedded in layers 5 and 6 at a depth of 1.60 m to 1.69 m, from the surface, found beautifully carved stone blocks of gneissic rock in association with a large number of undressed stones suggesting local manufacture of the architectural members. All these evidences provide clear examples of urban development in the Brahmaputra Valley during the early medieval period.

Among notable finds are a unique image of Vishnu in his tortoise incarnation datable to ninth-tenth century, two *Siva-lingas* and one *yonipitha,* the latter in an unfinished condition datable to the eleventh-twelfth century AD.

Pottery was found in enormous quantity and consisted of among others, the distinctive green-glazed ware. The pottery is bright red in colour and of very fine fabric. Both the exterior and interior surfaces are glazed with shining green colour, the common shapes being bowls and dishes.

The most characteristic pottery of the early medieval period consists of white or buff coloured kaolin wares. This kaolin ware is of very fine fabric and well baked, the common shapes being drinking vessels or *lota,* bowls, dishes, water jars, plates and lids. Kaolin was also used for making beads, bangles, earthen lamps, terracotta figurines and *Siva-lingas* which are found in large numbers. The unique kaolin pottery of Ambari could be labelled as "Ambari" wares and is a distinctive feature of the early medieval cultural phase of the Brahmaputra Valley.

11. EXPLORATIONS IN DISTRICT SIBSAGAR.— The Department of Archaeology, Government of Assam, took up the work of exploration in the Sibsagar district in Upper Assam. The district is bounded by the river Brahmaputra on its north and Nagaland on the south and had all the historical capitals of the late Ahom rulers of Assam who ruled from AD 1228 to 1826. Of the several capital cities established here by this dynasty, the two, known as .the Garhgaon and Rangpur, retain their complete layout consisting of multi-storeyed palaces, magazine-houses, gateways, frotifications, tanks and other secular and religious edifices. The district is also dotted with scores of temples of this period, among which well known ones are the groups of temples known as Gaurisagar, Jaisagar and Sibsagar temples.

The district of Sibsagar contains a good number of huge burial tumuli known as the Maidams which were raised by the Ahom kings and dignitaries over the dead. The earlier Maidams consisted of one or more structures made of heavy timber and in course of time timber was replaced by bricks and stone. However, all of these structures are invariably covered with a much bigger earthen mound, the shape of which is perfectly hemispherical. The Maidams are found both scattered as well as in groups throughout the district, the highest concentration being at Charaideo. In fact, Charaideo was the necropolis of almost all the late medieval kings of the Ahom dynasty of Assam. During the course of exploration, the entire area was mapped showing therein the Maidams, the historical roads and tanks.

The district did not reveal any site containing pre-Ahom remains; the few stone sculptures and bricks and terracottas of the earlier period located during the exploration do not seem to be in site.

The late-medieval Kachari capital of Maibong located in the midst of the North Cachar Hills was reconnoitred. The outline of the capital, alongwith river Mahur flowing along its north, was also plotted and some of the major ramparts were located.

12. EXCAVATION AT DAH-PARVATIA, TEZPUR, DISTRICT SONITPUR.— The Guwahati Circle of the Survey took up excavation at Dah-Parvatia site at Tezpur, under the direction of D. Bhengra assisted by S. K. Choudhary and P.M. Das to the east of the existing brick structures of Dah-Parvatia. Two trenches were laid measuring 10 x 5 m and 5 x 5 m.

At the depth of 154 metres brick flooring covering an area of 3.86 x 2.13m was exposed. On one of the bricks there was the footprint of an animal and a decorative design in another. No pottery and antiquities were found in course of the work.

BIHAR

13. EXCAVATION AT MANIER, DISTRICT PATNA.— In continuation or the previous year's work *(1988-89,* pp. 7-8) the Department of Ancient Indian History and Archaeology, Patna University, resumed excavation at Maner. The work was directed jointly by B. Narayan and A. K. Singh under the overall supervision of B. Sahai, with assistance from J.P. Singh, N. K. Arya and P. K. Bose.

The main objectives of this year's excavation were to ascertain further the pre-chalcolithic level and to find out whether the pre-chalcolithic level and to find out whether the massive brick stucture

of Pala period showing plan of a number of rooms extended further towards the southern side. Keeping in view the above objectives, the excavated trench measuring 12 x 7 m was further extended by 2 m towards southern side for undertaking the excavation work.

Excavation in the extended area revealed four cultural periods as noted earlier, Period I, belonging to the pre-chalcolithic phase, showed a mere replication of pottery types of neolithic character and some other finds (pl. Ill A-B) such as microlithic tools, stone pestles, spindle whorls made on pottery, etc., as noted in the last seasons's work. The thickness of the deposit was around 32 m. Period II was chalcolithic; it also showed a replication of wares such as black-and-red ware, black ware and red ware associated with microliths and spindle whorls made on pottery and terracottas as noted in the last season's work. But the most notable discovery of the period was the terracotta model of a copper hoard type of double-eged axe (pl. Ill C) bearing punctured designs in the form of triangles along both the edges. It bears strong resemblance with the copper hoard double-edged axe type preserved in the Patna Museum. The thickness of the deposit was around 1.15 m. Period III was NBP and revealed a brick wall of nine courses which was traced up to a distance of 2 m. The bricks used in the wall measure 40 m x 28 x 5 cm. The wall in question was found running from north-east to south-west but it takes a turn at right angle towards south and also towards the south-western end. The above wall was found at a depth of 2.20 m from the surface and continued upto the depth of 3.20 m. It cuts into layer 5 and is sealed by laver 3. Apart from the Northern Black Polished Ware (hereafter NBP) and its associated wares, the other finds included terracotta human figurines, iron objects, bone points, copper antimony rod and a dice made of ivory showing decorative patterns on its four sides (pl. Ill D). The thickness of the NBP deposit is about 3 metres.

Period IV is represented by a massive brick structure of the Pala period. The walls of this structure did not, however, extend further towards the southern side. Further clearance work in this area revealed that the huge brick structure consisted of nine rooms with corridors on both sides of the two central rooms. The rooms are oriented north-west to south-west and then take a turn towards south-west and north leaving a corridor about 1.40 m wide. At the south-westerly end, it again takes a turn towards north-westerly direction leaving an almost quadrangular courtyard measuring 8.15 *x* 6.90 m. Within this courtyard, there is another room, which measures 4.90 m north-west to south-west and 2.50 m north-east to south-west. The room has *surkhi-beaten* floor and a brick drain going towards the south westerly direction. Right above the floor, in the south-eastern comer, outline of a *koccha* well having a diameter of 240 m was detected. The well in question belongs to the early medieval period and is sealed by layer 2A which yielded mixed materials of different kinds including green glazed sherds of early medieval period.

14. EXACAVATION AT KOLHUA, DISTRICT VAISHALI.— L.C. Singh, assisted by D. K. Ambastha, D. K. Singh, P. C. Das, S. K. Arora, of the Excavation Branch III of the Survey carried out a limited excavation at the Stupa and Asokan pillar-complex at Kolhua (26°00[1]53"; 85° 01' 41"), with a view to ascertaining the extension of the complex and to establish relation amongst them.

Six trenches were laid in grid pattern, each measuring 20 x 20 m. Of these, two trenches were taken adjacent to the stupa-pillar complex towards west (Area A) and the remaining four trenches were taken at a distance of about 80 m south-west of the Asokan pillar and the stupa complex (Area B).

The excavations in Area A brought to light a votive stupa of *svastika* shape (pl. IV A) superimposed by two other votive stupas at a late stage. Twenty-six other votive stupas of different shapes and designs, such as circular, squarish, rectangular, *damaru* and cylindrical shaped, decorated with moulded and cut-brick designs, were also unearthed. On the basis of architectural features, pottery and antiquities, these could easily be dated to the Gupta period. It is interesting to note that all the structures had brick jelly lime-plastered floor which had been repaired successively. A vertical cutting line running north-south against Asokan pillar was noticed which had cut all the structures falling on its way. It appears that most of the structures had collapsed due to flood since 140 m thick silt deposit was uniformly noticed in all quardrants at a particular level (pl. IV B).

A monastic establishment (pl. V A) having three structural phases was exposed in Area B corresponding to the Kushana, Gupta and post-Gupta Periods. The orientation of the monastery in all the three phases was the same though there were marked differences in their alignment, using the structures of earlier phase as foundation for later activities. The monastery was almost square on plan measuring externally 10.30m (east- west) and 10.10 m (north-south). The width of the outer wall was 1.35 m. There was provision for three cells with a gallery on each side, -thus making 12 cells and *4* galleries in the monastery, with a central open courtyard, almost square on plan, measuring 6.50 m x 6.65 m. The space in-between the open courtyard and the cells all around measures 2.30 m in width which might have formed a covered verandah in front of the cells. It appears that the monastery had its entrance on the east, facing the main stupa, which is evident because of the covered portico in from with side chambers, one on each side. The portico in front is bigger than the side chambers, on its either sides, but the width remained the same.

The monastery had witnessed heavy thrust of flood from the west causing considerable damage to its western wall. In order to protect it from floods, a retaining wall had been provided with a buttress built in recessed offset manner, corresponding to the second structural phase of the monastery. A flat brick-paved platform, outside the monastery adjacent to western wall, was also noticed perhaps to serve as an open-air bathing platform. The platform remained in use in the successive phases as well. Further, the platform was provided with a drain, which remained in use in the successive phases of the monastery.

Among antiquities, terracotta beads, balls, gamesmen, hopscotch, stone and glass beads, iron lump were found from all levels. A silver punch-marked coin is a noteworthy find unearthed from the earliest level of the site excavated sc far. Terracotta snakehoods and bangles as well as shell bangles were collected from mid-levels. A good number of terracottas comprising both human and animal figurines, copper antimony rods, semi-precious stone beads and stone weights were also

recovered from the Sunga-Kuhsana levels. Inscribed terracotta plaques with the Buddhist creed *"ye dhamma hetu prabhava hetu..."* and two inscribed fragmentary sherds of red ware, one with the legend *"Buddha Nandasya karakah parigraha"* in Gupta Brahmi are particularly noteworthy (pl. V B-O

On the basis of pottery, the site can be divided into three periods: Period INBP; Period II, Sunga-Kushana; Period III, Gupta and post-Gupta. The NBP ware is associated with red, grey and black wares. The common types in NBP Ware are bowls of different sizes and dishes with incurved rim and incurved sides. All are made of well-levigated clay and are well-fired. The types represented in the grey ware, which is of fine fabric and is well-fired, are bowls with incuved rim and sides, dishes with featureless incurved rim, incurved sides and flat base. Deep bowls and few miniature pots are represented in black ware. The fabric ranges from medium to fine. It is well-fired and is mostly treated with a slip. A large number of pottery types are represented in red ware, such as vases, basins, storage jars, trough, lipped bowls, etc., the fabric ranging from coarse to fine. Red and black wares were encountered in plenty from the Sunga-Kushana levels. The types in red ware include wide-mouthed storage jars, vases, *lota,* sprinklers, spouted basins and lid-cum-bowl. The fabric ranges from coarse to fine. The pots are mostly treated with thin ocherous red slip. Most of them are well-fired, especially the spouted vessels and sprinklers. They are of fine fabric, well-fired and treated with thin ocherous red slip. Storage jars and wide-mouthed vases are of coarse fabric having unoxidized smoky mid-section. Husk and grit were mixed as tampering materials. In black ware, the types included deep bowl, sprinkler and spout. They are of medium fabric, well-fired and treated with a slip. Grey ware and NBP Ware are totally absent in the succeeding Sunga-Kushana period. From the Gupta and post-Gupta period, red ware was mostly encountered. The types included vases, lamps, lid-cum-bowls, deep bowls, long-handled deep bowls, sprinklers and spouts. Besides the types mentioned above, a few sherds bearing stamped floral designs were also found. The fabric ranges from coarse to medium and the pots almost well-fired. Only the big jars and thick varieties of basins are ill-fired showing unoxidized smoky mid-section. The pots have been treated with bright thick red slip. From the uppermost level, the types were almost the same as above. They can be distinguished by their surface treatment. The types from the uppermost level are generally devoid of surface treatment.

On the basis of pottery, antiquities and structural remains, the following three cultural levels have been marked:

Period I: NBP *(circa* third century to first century BC)

Period II: Sunga-Kushana *(circa* first century BC to second-third century AD)

Period III: Gupta and Post-Gupta (fourth to sixth-seventh century AD)

GOA

15. EXCAVATION AT ST. AUGUSTINE CHURCH, OLD GOA, DISTRICT NORTH GOA.—In continuation of the last year's work *(1988-89,* p.9) the Mini Circle of the Survey, Goa, under the direction of D. Hanumantha Rao in association with A. K. Sharma and assisted by S. K. Joshi, Ajit Kumar, S. S. Parekh, T. L. Sirdeshpande, B R. Satbhai, Gaikwad and Chandrakant Rama resumed excavation for the third[1] season with a view to lay bare the plan of the sixteenth century monument known as St. Augustine church complex.

Excavation was mainly taken up at three different places i.e., the southern belfry, left side chapels and the main altar at the extreme end on the west.

At southern belfry, removal of huge quantity of debris measuring 20 x 6 x 4 m resulted in exposing the plan and architectural details of the bell-tower. The walls are built of large-size dressed laterite blocks and plastered with lime mortar. The plinth is provided with ornamental mouldings.

Excavation in the left side chapels, five in number, led to the discovery of architectural details of individual chapels. These chapels were provided with vaulted roof made of dressed laterite blocks fixed with lime mortar. The walls were lime plastered and decorated with floral and geometrical designs in red and blue colours.

At the main altar, a huge quantity of debris flanking the entrance of the shrine was removed and remains of an ornamental entrance flanked with octagonal pilasters were exposed. The side walls of the shrine, including architectural details of the pilasters are further decorated with beautiful multi-coloured Italian tiles and paintings in red and blue tints some having also golden tinge. The floor and the pedestal of the main altar are paved with dressed and decorated basaltic slabs. The excavation on the right side of the main altar further yielded two high pedestals built on a longitudinal platform provided with steps built of dressed basaltic slabs.

Conservation of the exposed structures was also taken up simultaneously by way of grouting and watertightening the top, resetting ornamental pillars at the main entrance, restoration of fallen wall portions of various chapels on the southern side and relinking of missing architectural and other details, based on the available evidence.

GUJARAT

16. EXCAVATIONS AT ORIYO TIMBO, DISTRICT BHAVNAGAR.—A team of archaeologists from the Gujarat State Department of Archaeology and the University Museum of the University of Pennsylvania resumed the excavations at Oriyo Timbo near Chiroda Village in Gadhada (Swami Narayan) Taluka. Earlier work there by this same team in 1981 -82 (not reported in the *Review)* had

revealed a two period occupation of the site with a settlement of microlith-using inhabitants preceding a pastoral camp of the Lustrous Red Ware Period.

The renewed excavation at the site was intended to confirm that sequence, gather additional radiocarbon dating samples, expand the exposure of the Lustrous Red Ware camp, investigate the nature of the microlithic user's settlement and expand the sample of palaeobotanical remains for both periods.

The Lustrous Red Ware camp was found to be an extensive affair with at least one complex surface composed of various cooking facilities *(chulhas,* hearths, storage pits, etc.) along with one very fine *tandoor.* A broken terracotta bead/pendant with an incised geometric design was found associated with the -Lustrous Red Ware.

A true microlithic component was not found during the current excavation season, even though the new trenches were laid directly adjacent to the first set excavated in 1981 -82. The newly exposed portion of the site revealed that the Lustrous Red Ware occupants seem to have cut through the earlier occupation, completely removing it with their deep pits and other facilities.

Intensive flotation for palaeobotanical investigation of the site was undertaken.

17. EXCAVATION AT DHOLAVIRA, DISTRICT KUTCH.— The Excavation Branch V of the Survey carried out excavation at Dholavira under the direction of R.S. Bisht, assisted by L.S. Rao, Y.S. Rawat, V. H Parmar, N.B. Soni, J.B. Makwana and Ravinder Kumar of the Branch and for short duration by V. D. Jadhav and N. A. Saiyed of the Vadodara Circle of the Survey. The objectives of this seasons's work were (i) to confirm or otherwise some visible architectural features of the fortification system as well as of the layout of the Indus city by way of scientific surface digging to an average depth of 50 cm in long trenches across the site; (ii) to obtain complete stratigraphic documentation of all the three principal divisions by way of deep probing at each.

For the operation the entire site was divided into grids of 10 m square, each oriented 4° off the north in view of the average bearing of the visible structures. Three long trenches — one from the north to south across the citadel and the middle town, the second from the east to west across the citadel and the third again from the east to west across the middle town an the lower town were selected for excavation with a view to confirming the general as well as inner layout of the city and for understanding the function of the open spaces provided within and without the built up areas. Besides, for obtaining the stratigraphic sequence of the citadel and studying the growth of its fortification, a deep and broad rain-gully near the south-western comer was found ideal for deep digging.

A regular occupational deposit of over 12 m ascertained in a rain gully which has cut across the southern rampart and associated deposit of the upper citadel provided valuable information regarding the pre-Indus, early mature, late mature and post-urban phases of the Indus culture at the site. A deposit of about 2 m within the total deposit and associable with the first broadening of the rampart

still remains unexcavated. While the broad cultural contours are clearly discernible, final periodization is kept pending till second seasons's excavations. However, the following stages of successive development have been noticed.

The first phase of occupation at the site pertains to a non-Harappan or pre-Harappan culture represented by a deposit of 65 to 70 cm thickness divisible into four strata numbered 7 to 10. This deposit underlies the hitherto known first defensive wall which is named as IA, and overlies a sterile strata. The stratigraphic position of these .strata indicate that these should be associated with an earlier enclosure wall concealed underneath the Wall IA. No structural remains of this period have been exposed so far, but use of mud bricks of 36 x 18 x 9 cm is attested to in a debris, forming layer B. Most significantly, layer 10 as well as layer 7 have yielded evidence of copper-working in the form of fire-places associated with a lot of ash, globules of vitrified clay and copper slag and copper implements. Layer 10 has further provided pieces of crucible and two chiselled stone blocks, probably associated with metallurgical work of stone working.

The ceramic industry is devoid of Mature Harappan elements and is different in types, decoration and potting. The majority of the pottery is wheel-made red ware of lighter or pinkish tones treated with a variety of slip. Of surface treatment, there are examples of pleasing red slip, casual smearing with dull brown pigment, thickly coated buff paste, deep black slip on leather-coloured ware, or thinly applied white paint. A few sherds were found decorated with incised horizontal grooves on the exterior.. In one example, the incisions were done in reserve slip technique. Among the most distinct pottery so far noticed are a dull red ware decorated on the exterior with wavy lines painted in black and white and a dish which is internally decorated with wavy incisions treated with white slip. A red ware vessel of wide mouth and with a flaring rim making a C-profile with the neck is found treated with a smooth red slip externally as well as internally upto the neck. This is further decorated with a black band round the rim. Besides, the assemblage includes sherds of a soapy, buff, coarse red and crude handmade wares. Minor antiquities are rare. Copper-cools and pieces were found in a good number.

The second phase begins with the construction of defensive wall IA. This wall is found neatly plastered with a successive coat of lime rich clay of different colours, eleven to thirteen in number. The extant height of it measures 630 m with a steep batter of 75°. Its maximum available width at a height of 4 m reads 265 m whereas outer face is not traceable there. The contemporary deposit is represented by a 080 to 085 m thick accumulation of six strata which are numbered 1 to 6 from top downwards. Layers 6 and 5 produced very little material, ceramic or otherwise while the upper strata from layer 4 to layer 1 provided enough diagnostic items of the Harappan civilization in the form of terracotta triangular cakes, chert blades, steatite beads, perforated jars and a few other forms of standard fabrics as well as surface decoration. Interestingly, the ceramics of the preceding phase continued with the new elements mentioned above.

The third phase succeeding the former without any break starts with the widening of the fortification wall, IA from inner side by adding another 4.80 m thick mud brick wall named IB. The

construction of this wall shows superb workmanship as well as the use of standardized and moulded bricks made of good clay of different colours. The size of the bricks used measure 48 x 24 x 12, 44 x 22 x 11 and 40 x 20 x 10 cm. Its inner face registers a taper of 80° and is found plastered over with white, buff and pink-coloured clay. The initial deposit of this phase remains still untapped for over two metres though the upper one that stands exposed shows prevalence of the regular Harappan culture. This wall remained in use without any major rebuilding or repair till an occupational deposit of about 3.30 m including the 2 m untapped one, deposited against it. But after this deposition, which contains may sub-phases of house building, it seems, as revealed by the evidence, that the fortification wall of the citadel was damaged by a catastrophe, very possibly by a severe earthquake. After this event, a 1.90 m wide revetment was added from inner side while the exterior was reconstructed after removing fallen debris with fresh masonry made of better quality bricks, which was veneered with dressed stones. The work is as broad as 6 m to 6.50m. After this major phase of rebuilding the Harappans lived through an accumulation of over 7 m which includes about 1 m deposit of later mature Indus culture when the city started declining.

The late phase of the mature Harappan shows general decline in the architecture, house building and fortifications, ceramics as well as in other spheres of their cultural repertoire, although the use of all essential objects continued. Seals of this phase are simple, smaller and usually devoid of animal figures. However, much attention was paid to the engraving of characters. That apart, there are crude terracotta seals or amulets bearing simple geometric motifs of bold and short strokes.

Architecturally, the Harappans of Dholavira were master builders as revealed by their excellent town-planning, as well as monumental and exquisite architecture. Many unique architectural details of the period have been brought to light in the form of gateways, water structures, defensive walls and houses at the site. In the citadel, two gates viz., east gate and north gate and a water structure have been exposed partially.

The east gate of the citadel was laid bare for half the width falling in the EW trench in south. Occupying the central location in the eastern arm of the castle, it has a staircase, a sunken passageway, an elevated chamber and a high front terrace. From a wide doorway which opens on the terrace, a 8.20 m long passageway running beside the elevated chamber leads to a flight of fifteen steps. The wide doorway is found reduced into a narrow passage by blocking it from either side. This blocking was done possibly by the late Harappans. The elevated chamber on the south side of the passageway measures 7.20 m in length and 4.60 m in breadth and the extant height of its wall measures 4.30 m at the maximum, while the total height of the chamber from the exposed floor of passageway measures 5.70 m. The edge of the chamber beside passageway is furnished with aesthetic arrangement of neatly cut and highly polished sandstone blocks at its centre and at both the ends. The central block is further surmounted by a smooth polished and beautifully moulded reel-shaped pillar base with a circular socket on its top to hold the dismantled upper member. The other two blocks at the either end, each at a distance of 2.35 m from the central one, bear two 31 cm long and 3 cm deep

parallel grooves possibly for fixing wooden case around a pilaster. Interestingly, two large bead-shaped pillar members placed upon one another have been recovered from the side of .the central pillar base. These are perfectly circular in cross section with a convex side and truncated ends with' a circular socket hole in the centre. Possible restoration of the shape of pillar suggests that one of them might have been put on the top of the reel-shaped pillar base.

In the other NS cutting across the northern wall of the citadel, a massive gate complex was exposed, which is hereunder named as north gate. A grandest architectural achievement of Harappans as it revealed perfect planning in its construction, this gate at present covers an area of about28mNS x 16mEW. The main chamber of this gate is provided in the thickness of the defensive wall and furnished with an L-shaped staircase from the inner side of the citadel and a broad terrace from outside. The gate is planned slightly in different architectural planning than that of the east gate. The length of the chamber including the width of sunken passageway measures 12.80 m, and it has a width of 7.20 m. The passageway divides the chamber more or less into two equal halves of 7.20 x 4.50 m. The 3.60 m wide passageway is exposed upto a length of 8 m and was found provided with a 3.50 m wide doorway at its northern end. The passage way leads to a 3.55 m broad flight of steps of which ten steps are exposed. This flight of steps in its turn is linked through a 3.55 m long and 182 m wide landing to another 2 m broad flight of thirteen steps leading towards eastern corridor provided from inner side of the citadel. It seems that the latter was being raised simultaneously with the increase in the level of corridor leading to the interior of the citadel. The chambers are at a height of 2 m. from the exposed floor of the passageway. The edge of each of the chambers on the passageway side is furnished with highly polished stone blocks of 0.74 x 0.57x 0.20 m size at both the northern as well as southern ends. Between them there was a central block holding a reel-shaped pillar base as revealed by the presence of a large stone slab, a stone block with the impression of a circle off one side and a reel-shaped pillar base, all in a disturbed position, in the central part of the eastern chamber of the gate. The extant height of the eastern chamber from the exposed base of passageway measures 4.30 m. On the latest working floor of the western side chamber is found the large lettered Harappan inscription.

The front terrace of the north gate is 6 m high from the exposed topmost working level of the open space. It projects about 12 m while the exposed breadth along east-west is confirmed for 19m but seems to be extending on either side.

Behind the north gate, in the central zone of the citadel there has been exposed a 12.80 m wide water reservoir furnished with a 28 m long and 0.70 m broad inlet channel duly covered with large stone slabs having provision of manholes, one of them measuring 25 x 25 cm. The structure has been exposed to a length of 9 m only, but surface features of the mound indicate that it must be occupying quite a large area of the citadel.

Other remains of the Harappan period include parts of domestic structures, workshops of lapidaries and shell workers, big drains, smaller house drains including cut-stone one, etc.

The outer fortification wall has been laid bare at four points : two in the western arm, and one each in the northern as well as southern arm. But the eastern arm could not be confirmed in the excavation at expected point. On the north, internally stone faced rampart was exposed in a 10 x 10m area but the outer edge was found destroyed. Of the southern wall, the mud plastered inner face of the brick rampart providing a width of 8.40 m inclusive of a thin stone-veneer on the outer face was determined at a point where a broad tie-wall emanating from the juncture of the defensive wails of the upper and lower divisions of citadel joins the outer fortification. On the west, the city wall was confirmed at two points: one, in the southern EW trench, and the other, in a rain-gully close to its northern counterpart. In the first, the inner half was found completely eroded while the other half together with a bastion was exposed. The wall was rebuilt once. The other trench exhibited that the outer wall was initially 3.60 m wide and subsequently widened internally by adding another construction of 1.20 m at a later date. Initially, there was no stone veneering as is evident in both the digs. However, it is found that quite a wide area on either side of the wall was successively floored for an easy walk of the patrolling guards round the fortification. On the east, the city wall was found worn down to the rock bed which itself is much higher than the level on which lower town was raised.

Of the Middle Town, all the four walls have been confirmed. While the east, north and west walls have displayed similar architecture, i.e., all are basically mud-brick walls faced with stone, the southern one shows different construction and consists of three thick stone walls running close as well as parallel to each other with the interstices hearted with earth. Further, this wall is constructed on a thick Harappan deposit which, in its upper strata, contains the material of the late phase. This wall is the highest as well as the widest of all the walls of the middle town. It registers a width of 6.60 m while the west one which was found in fine state of preservation of only 4.20 m broad with extant height of 2.10 m. The widths of other two walls are yet to be ascertained precisely as their outer edges are found badly damaged in the operation area. Interestingly, a 1.45 m high and 1.10 m broad covered drain was found provided in the west wall possibly for outletting the rain water into the outer zone of the city.

The most valuable finding of the season is an inscription exposed on the floor of western chamber of north gate. It consists of nine large Harappan letters. Each letter is about 37 cm in height and 25 to 27 cm in width and made by arranging cut pieces of a milk white crystalline material.

Among other important finds of the period are seals, complete or fragmentary; sealings of clay; one bronze figurine of an animal and several microdrill-bits made out of a hard stone. Seals bear short epigraphs in the Harappan script and many of them are engraved with unicorns and in one broken piece there appears to be a syncretic animal. Other finds are : beads of semi precious stones, gold, copper, shell, steatite, faience and clay; usual copper objects, bangles of stone, shell and terracotta, terracotta models of cart-frames, wheels, animals, gamesmen, triangular cakes, and a variety of stone querns, grinders, rubbers, polishers, pestles and mortar used for domestic as well as industrial purposes.

The last period at the site belongs to. the post-urban phase of the antecedent period in a transformed form and size. This period is again divisible into two sub-phases on the basis of their building architecture. In the first phase, as revealed through excavation, the people raised their jerry built rectangular constructions preferably under the protective shelter of and right against the standing fortwalls, or on the gate-terraces. They even occupied the gate chambers for sundry use. Those may be held responsible for the first vandalism at the abandoned city as they removed many attractive and useful architectural members from the earlier buildings and utilized them for different uses.

In the the ceramics, a few new variety of wares with surface decoration closely related to the Jhukar assemblage on one hand and to the Black-and-Red ware tradition bringing along a different class of thin grey and black wares often burnished and dull red ware with incised decoration on the other hand make their appearance.

The second sub-phase is attested by construction of new variety of structures for dwelling as well as other purposes. The people started living in circular huts' made of stones recovered from the debris of earlier houses. One of these structures exposed in the citadel area measures in diameter 340m internally and 5 m externally and in the centre of it there a stone with a depression to hold wooden upright for supporting the roof was noticed". These type of circular structures are still in vogue in the Kutch and are locally called *'Kuda'.* Culturally, these people do not seem to be of a different stock as their pottery and other material suggest. But they do not seem to have had a compact or permanent settlement and may have been coming here periodically or seasonally. Such structures can be seen everywhere at the site. After this semi-nomadic phase, the site was never occupied again.

18. EXCAVATION AT SHIKARIJR (VALAMIYO TIMBO), DISTRICT KUTCH.— The Department of Archaeology, Government of Gujarat continued *(1988-89,* p.21) excavations at Valamiyo Timbo in Shikarpur, in taluka Bhachau, with a view to understand the overall stratigraphy and chronology of the site. In two trenches G and H, near the southern slope rubble and mud brick structures which mainly were oriented north-south were exposed. The top two layers which contained loose ashy earth with charred bones, pottery, etc., indicated a huge fire which may have almost destroyed the habitation in mound I. It may be noted that similar layer of more than a metre thickness was encountered in previous season's excavation of mound I.

Two parallel walls of rubble were exposed in trench G and part of the trench H. Mud brick floor or a broad wall under these two parallel walls was also noticed. At the south-western corner of these walls a soakage jar was found embedded. In the trench H, a big circular hearth-like depression filled with loose ash was also exposed. It was found covered with big rubbles.

Further excavation was continued in trench G, N and H in the western part upto a depth of four metres. Apart from mud-bricks, antiquities like chert blades, typical Harappan pottery, beads, etc., were found here.

Typical Harappan pottery like heavy and medium fabric red ware, buff ware, coarse red ware, perforated ware, dish-on-stand, storage jars and smaller jars, dishes, basins, bowls, beakers, vases, etc., alongwith chert blades, steatite disc beads, copper fragments, camelian and agate beads and large number of triangular cakes were found.

Trenches J, K and L were laid on the southern slopes of mound I with a view to tracing the extension or end of habitation on that side. Here in trench J some jar-like vessels were exposed just below the surface. In trench J, burial-like deposit in a perforated pot alongwith red ware jar was found. Fragmentary bones in these pots probably indicate some kind of burial. However, these bones were too fragile and fragmentary for further study. A rubble wall running north-south was found just adjoining this burial. In the north-western corner of this trench, a mud-brick floor or top portion of a broad protection wall was exposed. Similar structure was also exposed in trenches on the northern and eastern slopes of the site. It therefore seems that the habitation was enclosed by this broad wall or raised platform-like structure.

Trenches K and L could be excavated only upto the depth between 15 cm and 60 cm because of the floor encountered there. Circular outline of a jar-like pot was already exposed here on the surface itself. A rubble wall running NS was exposed here below layer (1). The presence of six saddle querns around this structure is noteworthy. These querns with plano-concave surface had been used quite a lot. Both the trenches revealed typical Harappan pottery comprising perforated red, buff and other associated wares.

19. EXPLORATION IN DISTRICT MAHESANA.— The Department of Archaeology, Government of Gujarat, reported the discovery of following mounds/sites in Sami taluka of Mahesana district:

Taluk	*Village*	*Nature of remains*
Sami	Babari	Medieval mound
-do-	Baspa	Late medieval site
-do-	Bolera (Kalari Mound)	Harappan and medieval
-do-	Bolera Medieval Bolakiya Vimo timbo)	
-do-	Gochnad	Early medieval and medieval
Sami	Jakhel Uchodi-no-timbo)	Microlithic mound
-do-	Jesada (Mobhiyano timbo)	Late medieval
-do-	Khandya	Medieval
-do-	Kharchariya	Late historic

Taluk	*Village*	*Nature of remains*
—do—	Muspur	Late medieval site
—do—	Nayaka	Late medieval mound
—do—	Padla	Late medieval mound
—do—	Ratanpur	Late medieval mound
—do—	Ratanpur (Tokariyo Timbo)	Harappan and microlithic
—do—	Runi	Microlithic and medieval mound
—do—	Shankheshwar	Medieval mound
—do—	Vavol	Medieval mound

20. EXCAVATIONS AT KUNTASI, DISTRICT RAJKOT.— M. K. Dhavalikar, Vasant Shihde and S. Atre of the Department of Archaeology, Deccan College, Pune, and M.H. Raval and Y.M. Chitalwala of the State Department of Archaeology, Government of Gujarat, continued excavation at Kuntasi *(1988-89,* p. 11). The excavation this year was confined to the eastern part of the mound.

Altogether fifteen structures including a huge gate with bastions, were exposed during this season's work. The gateway with sloping ramp runs straight to the west to a length of 40 m and then turns to the north. On both sides of the ramp were uncovered roughly rectangular bastions consisting of walls along the .margin with the area enclosed by them packed with boulders. Both the bastions are identical in size and measuring 10.30 m in length and 3.50 m in width.

A number of interconnected rooms, either squarish or rectangular on plan, were exposed on both sides of the passage. Two roughly squarish rooms (ST 40 and 41) were exposed on the southern side, whereas six rooms, all of them interconnected (ST 43 to 50), were exposed on the northern side of the passage. None of the rooms mentioned above, however, yielded evidence of either cooking or storage and therefore it is not unlikely that they were occupied by the security personnels.

A large, roughly triangular structure, measuring 765 m EW and 6.7m NS was noticed to the west of the complex comprising of ST 43 to 50. The structure had a narrow verandah on the eastern side (6.85 m x 1.30 m) and a step, resembling *chandrasila.* Inside the structure, by the side of the southern wall in the middle, was noticed a small squarish platform measuring 15 x 15 m. Considering its peculiar shape, isolation, *chandrasila* and a small platform, it will perhaps not be far-fetched to identify this structure as a shrine.

A stone platform emanating from the southern pan of ST 26, exposed last year was also excavated. It is 1.60 m long and 3.80 m wide and can be divided into three pans. It is semi-circular in the centre and rectangular on either side. The semi-circular portion measures 5.95 m in length and is 3.10 m wide. The platform could be considered as ceremonial, which was joined to ST 26. It may

be recalled that a similar semi-circular platform built of fired bricks was encountered at Mohen-jo-daro in the 'L' area of the citadel. The latter has been identified as a ceremonial platform connected with the religious beliefs of the people. The same may have been the function of the platform exposed at Kuntasi. In that case, ST 26 can be identified as the residence of the ruling chief priest of Kuntasi.

Among the finds mention may be made of two copper rings with spiral bezels; these are the unique specimens and have not been reported so far from any other Harappan site. The other finds included one thousand microbeads of steatite, 600 paste beads and 14 gold foil beads.

21. EXCAVATIONS AT GORMATI-NI-KHAN, DHANSURA, DISTRICT SABARKANTHA.— B. J. Makwana of the Department of Archaeology of the Government of Gujarat and Suman H. Pandya of the DPCBL Mahila Arts and Commerce College, Dhansura undertook excavation at the mound known as Gormati-ni-Khan situated to the north of the village Dhansura in Modasa taluka of the district. During excavation, two human skeletons were unearthed from a depth of 105 cms which were oriented north-east to south-west. One of these was of an adult while the other was that of a child. Broken teeth of large animals, back-bones and other burnt bones, microlithic tools e.g., blade, lunates, point, flake, scraper made from chert, carnelian and chalcedony were also found.

Mesolithic sites located over sand dunes discovered in the vicinity of the Dhansura town. Among these, the site of Dhansura-I which is locally known as Gormati-ni-Khan meaning mine of earth was excavated on a small scale by Suman H. Pandya of the DPCBL. Mahila Arts and Commerce College, Dhansura, and B.J. Makwana and his colleagues from the Department of Archaeology, Gujarat.

The site of Dhansura-I is nearly one km west of the present town of Dhansura and covers an area measuring 337 x 268 metres and is about 7 metres high from the surrounding areas

In one of the trenches human skeleton was found. In the same trench, below the skeleton a saddle quern found in association with charred bones of *Bos indicus,* hammerstones and microliths, etc.

The remains can be divided into two periods termed as Period I and Period II.

Period-I was marked by non-geometric tools, faunal remains of *Bos indicus* and other large animals, a saddle quern, hammerstones, etc., from depth varying from 110 cms to 200 cms below the surface.

The important find of this level was two human skeleton remains. Skeleton No. I was found at a depth of 100 to 115 cms below the surface. It was oriented north-east to south-west, the face being turned towards the right.

A one metre long bone and a chert core was also found near the left arm. The skeleton was complete and from top of the skull to the toes measured about 170 cm. The head was typically dolicocephalic.

Skeleton No II was of a teen-aged person. It was placed near Skeleton No. I and was found at a depth of 98 cms below the surface. This skeleton was incomplete. The head and the left side of the skeleton were missing.

Period II continued without any break, and is characterized by geometric tools made of fine grained stones, wastes and large quantity of charred bones of small animals, birds, and an unperforated stone bead.

22. EXPLORATION IN DISTRICT SURAT.— In the course of village-to-village survey, Vilas Jadhav of the Vadodara Circle of the Survey brought to light the following sites of archaeological interest:

Taluk	*Site/Village*	*Nature of remains*
Vyara	Ambia	Microliths
—do—	Antapur	Late medieval habitation site
—do—	Balpur	Late medieval Siva temple and hero-stone
—do—	Bardipada	Microliths
—do—	Behra	Miniature sculpture of Vishnu and Bhairava of sixteenth century AD
—do—	Besunia	Microliths
—do—	Bhamanamah	Microliths
—do—	Bheskatri	Palaeoliths
—do—	Dhamandevi	Late medieval hero-stone
—do—	Darakwan	Sculpture of Ganesa and Lakshmi of sixteenth century
—do—	Dholka	Microliths
—do_	Dolwan	Remains of fifteenth century brick temple
—do—	Garwan	Microliths
—do—	Khuradi	Late medieval hero-stone
—do—	Kosmadi	Eighteenth century habitation site
—do—	Kutnbhia	Sixteenth century Vishnu sculpture
—do—	Panchol	Sixteenth century Vishnu sculpture
—do—	Pipalwara	Remains of late medieval brick temple

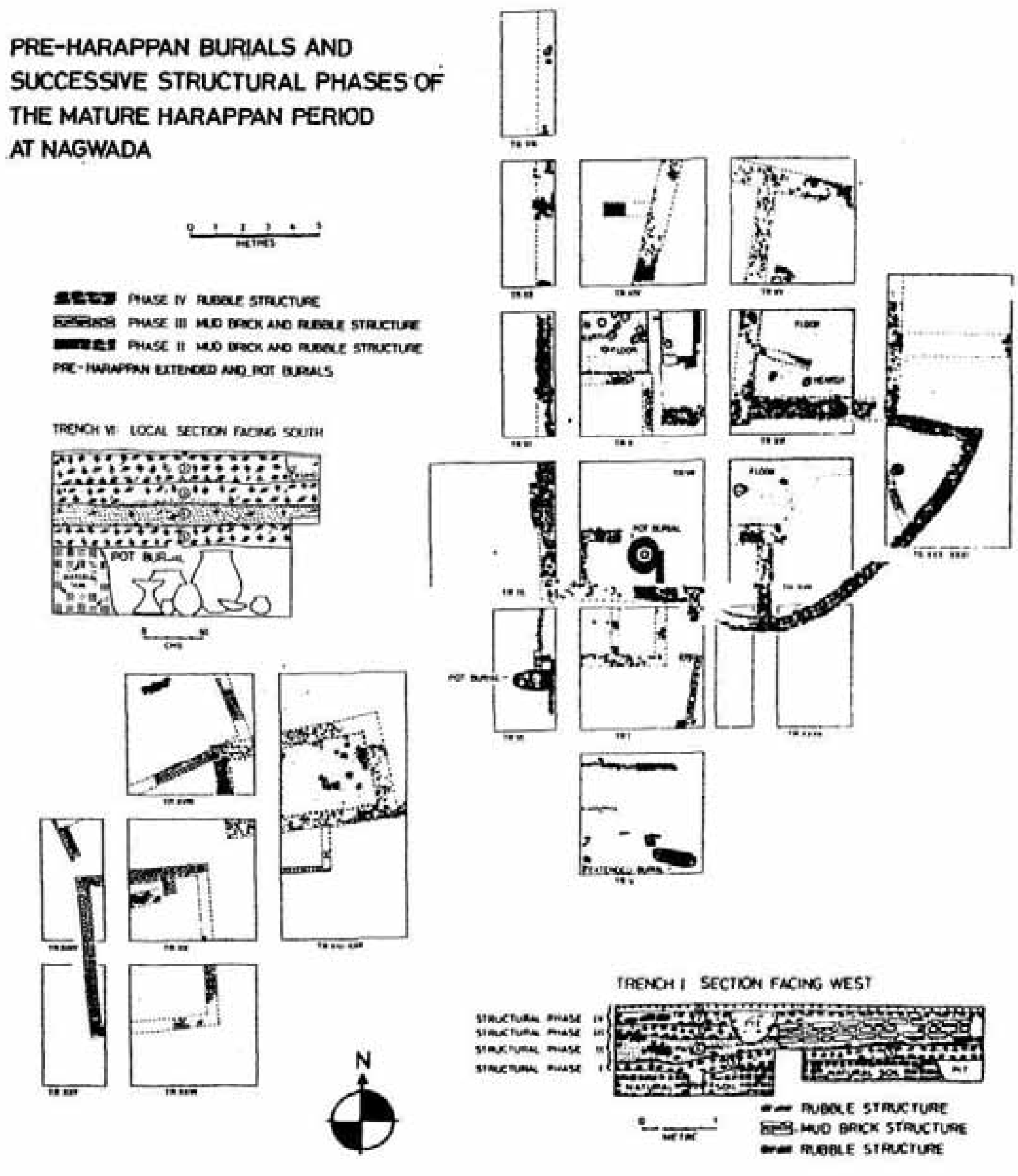

PRE-HARAPPAN BURIALS AND
SUCCESSIVE STRUCTURAL PHASES OF
THE MATURE HARAPPAN PERIOD
AT NAGWADA
TRENCH VI LOCAL SECTION FACING SOUTH
POT BURIAL
FLOOR
HEARTH
POT BURIAL
EXTENDED BURIAL
TRENCH I SECTION FACING WEST
RUBBLE STRUCTURE
MUD BRICK STRUCTURE
RUBBLE STRUCTURE
N

FIG. 1

23. EXCAVATION AT NAGWADA, DISTRICT SURENDRANAGAR.— In continuation of the previous year's work *(1988-89,* pp.13-17), K.T.M. Hegde, assisted by V.H. Sonawane and P. Ajit Prasad, resumed excavation at Nagwada to understand extension of the mature Harappan settlement and to discover pre-Harappan settlement. The excavation brought to light one more extended burial with grave goods of the pre-Harappan period; however, no structural remains could be found.

In the upper levels, a segment of a circular rubble structure and a number of mud brick and rubble structures having four different structural phases of the mature Harappan period were brought to light (fig. 1). These structures yielded a variety of pottery—both typically Harappan and non-Harappan and large perforated jars made in gritty red ware fabric. These structures also yielded a variety of ornamental steatite, lapis lazuli, amazonite and agate beads. A number of fragments of shell bangles were also recovered. More evidence for the manufacture of agate and amazonite beads and shell bangles cut from Turbinella pyrum shells at the site was also found. Four charcoal samples were collected from different levels of the mature Harappan period during this seasons' work. Their assay is awaited.

HARYANA

24. EXPLORATION IN DISTRICT KARNAL.— In the course of village-to-village survey, Kanwar Singh of the Chandigarh Circle of the Survey discovered the following sites in Panipat tehsil:

Tehsil	*Village/Site*	*Nature of remains*
Panipat	Anjanthali	Unidentified sculpture
do-	Bajwah	Ancient site
-do-	Balwana	Ancient site, temple
-do-	Bhukapuri	Ancient site
-do-	Bursham	Mound
-do-	Dera Talab Wala, (Amin)	Old tank
-do-	Israna	Mound
-do-	Kayath	Bathing *ghats,* temple
-do-	Kirmach	Ancient site
-do-	Saga	Ancient site
-do-	Samalakha	Palatial building, temple
-do-	Saunkra	Old mosque
-do-	Siwah	Mound, bathing *ghats,* two inscriptions
-do-	Taraori	Old *sarai*

25. EXCAVATION AT HARSH-KA-TILA, THANESAR, DISTRICT KURUSHETRA.— The Institute of Archaeology of the Survey continued *(1988-89,* pp. 21-24) excavations at Harsh-ka-tila, under the direction of B.M. Pande, assisted by K.P. Gupta, R.P. Sharma, C.B. Mishra, K.C. Nauriyal, R, Dalai, H. Thapliyal of the Headquarters Office, A.K. Patel of the Srinagar Circle, D.N. Dimri of the Jaipur Circle, Jasmer Singh and Vinod Kumar of the Chandigarh Circle of the Survey.

In addition to imparting field training to students of the Institute of Archaeology, this season's work had the following main objectives to realize: first, to explore the context of previously excavated scanty grey ware sherds of the PGW lineage from TSR-1; second, to investigate further components of the cultural milieu of each period; third, to further probe the nature and trace the detailed plan of the large structure partly-excavated in TSR-3; fourth, to obtain further evidence about remains in the area contiguous to the rain-gully towards further west on the southern slope of TSR-3; and finally, to investigate in the north-eastern part of TSR-1, where exist the structural remains of the rectangular *hauz* (cistern) and a few fallen chunks of walls with pottery conduits, forming possibly part of a *hammam* (bath house) complex. For these objectives, which essentially follow the last two season's results, deep digging was continued in some previously excavated quadrants and a few new trenches were also opened up on both sides, and away from the old excavated trenches.

Deep digging in trench YG3 in TSR-1 revealed an average 60 cm thick deposit of homogeneous clay? dark brown in colour, overlying the natural soil. In fact, it was in this deposit that sherds of the Painted Grey Ware alongwith other associated wares namely' plain grey, black-slipped and red wares were found. Large number of sherds, some of which compare fairly well with the finest variety of the PGW sherds known elsewhere from the main epicentral sites were from a pit cut into this deposit. The nature and purpose of this deposit, in spite of persistent efforts, could not be understood chiefly because of the rather too small area of excavation and excessive dampness and sticky nature of deposits in the lower half. In the absence of any floor level or ashy layer it is not yet clear if the deposit was a regular one; however, evidence of a complete and a fragmentary hearth was noticed. In any case, the presence of Painted Grey Ware sherds, in such a quantity does indicate the existence of regular PGW levels at the site. The pottery shapes are utilitarian and simple representing mainly dishes and bowls and their variants, which are common both to PGW and plain grey ware. The types in the associated red wares include, in addition, jars, miniature vases and *handis.* The paintings on the finer variety of the grey ware are in black comprising mainly simple horizontal bands, vertical and oblique strokes, dots and dashes, etc. A few PGW sherds also exhibit some exquisite combination of more elaborate geometrical designs. No other object was found in these levels.

Stratigraphically, the Painted Grey Ware level antedates the Kushana period at the site; however, it is at present difficult to work out the gap between the two periods. Excavations during the season confirmed, among other things, the evidence about the mud-rampart of the Kushana period. In fact, during this season's work, at least two constructional phases of the mud-rampart were clearly determined by making a cutting across the rampart. Significantly enough, traces of a hearth

and a small ashy patch suggest a temporary working level atop the then existing height of the mud-rampart. Being 14 m minimum wide at the base, the extant height of the mud-rampart was difficult to realise for the simple reason that the composition of the mud-rampart and the natural soil was one and the same; except for stray occurrence of bone pieces, and tiny potsherds from the body of the rampart, it was difficult to draw distinction between the end of natural soil and the beginning of the mud-rampart. However, an important indication was a nearly horizontal crack in the sections of some large pits cut into the rampart. This evidence tallies fairly well with the lowest ground level below which no signs of human habitation were encountered. With this revelation, the extant height of this earthwork comes approximately close to two metres.

Inside the fortification were found many house walls and other associated features of a township, majority of which have so far been excavated in the rain-gully (pl. VI). The earliest walls for the most part were made of mud-bricks of the size 41 x 27 x 5 5 cm. It seems likely that baked bricks were used only for drains in earlier phase. In the later phase kiln burnt bricks replaced the mud-bricks. Evidence was also found of mud floors which had been repaired and maintained. In a few places, mud plaster was noticed on walls and even floors.

On the northern slopes of the mound, in TSR-1, outside the fortifications a 7 m long covered drain of square burnt bricks (size 27 x 27 x 8 cm and 28 x 28 x 9 cm) covered with bricks of the same size was also exposed. This drain is, curiously enough, not found to be straight.

Particularly interesting among the structural remains was a square, multicoursed structure of baked bricks, the top of which was partially exposed during the previous seasons's excavations. It was found that the lower five courses of this structure formed part of the foundation. One of the extant courses of this platform had fine mouldings. A small rectangular, shaft-like hollow space in the centre of the platform, which was scooped out, yielded a few objects like a fragmentary tooth, tiny copper pieces, potsherds and charred grains. However, in view of »he fact and the area of which the platform was built was towards the periphery of the site and had above it eroded material from the slopes, one cannot vouch if these objects were originally placed there. At the same time the possibility of this platform being of some religious or ritual purpose cannot be ruled out.

Further excavations below the levels of this structure, particularly on its north-eastern side, unearthed a large pit containing skull each of an equine and a bovine, placed parallel side by side in north-south orientation alongwith other bones, charcoal, charred grains and ash. It is not unlikely that this pit and its contents perhaps mark some sacrificial spot.

The pottery wares and forms of the period are the same as reported in the previous two seasons; the new shapes are a medium vessel with broken bottom, a fragmentary pedestalled vessel and spouted vessels. Heavily corroded copper coins, copper forcep and fragments of antimony rods; terracotta plaques, human and animal figurines; a terracotta sealing bearing floral design; ivory, bone and shell ornaments; beads of terracotta and semi-precious stones, bone arrowhead and a fragmentary grey slate plaque depicting a female in low relief were also found. Among the terracotta human figurines noteworthy are a mutilated female figure holding some object in her right hand; a pot-

bellied male figure with both hands on the chest and some plaque showing figures perhaps of Buddha. Among animal figurines, mention may be made of terracotta bull having large hump, and a crouched Nandi over a pedestal.

The Kushana period is followed by the Gupta period without any break. It is marked by intensified structural activity. In the rain-gully of TSR-3 a massive structural complex, evidently occupying an area immediately north of the defence stands exposed with the walls laid along the cardinal directions. Raised on deep foundations, the north south oriented walls of this complex are wide; these seem to be connected with the east-west oriented walls. In one of the .rooms of this structure a mud floor had four pots, three partially embedded in the floor and one, complete but broken lying on it.

The distinctive pottery of the Gupta period are the moulded wares which appear right from the beginning of the period . The only shapes found are the bowls with decoration in the form of floral and geometrical designs. The Red Polished Ware continued as the main pottery throughout the period.

Important antiquities of this period are a terracotta plaque depicting an amorous couple, a pot-bellied goat-headed seated figure of Naigamesha (pl. VII A), a beautiful female head (pl. VIIB) and two seals, one depicting a conch and the other an inscription in Brahmi characters reading *'Vanagrama'* and terracotta bull figurines having decorated bands round the neck and marks of pin holes all over the body.. Besides, beads of terracotta, semiprecious stones, objects of bone, ivory, shell, copper and iron were recovered.

The new features of the preceding period were found to continue in the Vardhana period as well which followed without any break. The most important structure of this period is a massive building complex. During this period the fortification wall was also renovated.

This large building complex in the southern portion of the mound was further excavated upto the foundation levels in some portions. In one of the areas, within the complex, where deep digging was done, were exposed four walls forming a small room of the size of 1.65 x 1.38 m. The bricks used in the structure measure 38 x 21 x 7 and 35 x 21 x 6 cm. The room on all its four sides had around it other rooms; their interrelationship however is "not clear since these have not been fully exposed. No evidence has been found of door in any of the walls of this building which was in constant use for fairly long time during the course of which additions and alterations were made. It seems to have been in use in Rajput period as well.

As reported last year, the pottery of the Vardhana period is characterized by impressed designs. Besides, simple painted decoration in the form of plain horizontal bands round the neck and, sometimes, round the shoulder of the vessel have also been found. The impressed designs include boldly executed chequer pattern and floral motifs mostly dusted with mica.

Only a few terracottas were found from this period among which important are an elephant and a double-moulded leogryph (pl. VIIC) with a handle, a mould for the head of a female, a headless

bust with prominent female breasts and a plaque depicting a highly ornamental standing female figure.

The Vardhana period was followed by the Rajput period without any break of occupation. The diverse structural activity of the period is evidenced in the southern portion of the mound (TSR-3) where a portion of the above mentioned large building-complex has been partially exposed revealing two rooms of 2.73 x 2.10 m and 3.40 x 2. 10 m size upto a depth of sixty brick courses. One of the rooms had well laid floor of fine bricks of which only some portions could be traced. The bricks been laid very carefully with fine joints. As noted above, no evidence of entrance to these rooms has been found so far. Recovery of some interesting finds from these rooms comprise a fragmentary hilt of a sword, arrowheads, long nails, and broken pieces of sickle, all of iron, a large terracotta wheel, a beautiful lid-like terracotta object bearing flower design at the top, and a conch-shaped terracotta stamp with a floral design, etc. The collapse of the building seems to be due to fire, as is evident from the marks of burning on the walls and presence of charcoal pieces.

A new trench laid on the southern slopes of the mound, not far from the southwestern corner of the mound, confirmed the continuation of the defence wall, which was exposed in the rain gully during the previous seasons.

The pottery of the period is basically a continuation of the preceding period with only some changes such as sharper rim of the medium-sized bowl and poor fabric and surface decoration.

Other important finds from this period include a terracotta plaque depicting a standing couple, a potsherd bearing stamp of a dancing figure and certain terracotta ritual objects found at the same spot as last year. These are particularly significant and include three votive lamps, one having an inscription in Kutila characters of eighth-ninth century, two small votive tank-like objects, three ladles, a betel-leaf shaped *patra* having incised lines on the lower surface, a rectangular flat object with a hole at one corner, a small wheel, and hundreds of clay tablets (pl. VIII A). Besides, beads of terracotta and semiprecious stones, objects of bone, shell and ivory, copper and iron implements were also found. Among the terracotta animal figurines mention may be made of bull figurines with applique neck-band and eyes with prominent hump and sometime pin-hole decoration on entire body, bird figurines and a black couchant bull over a pedestal (pl. VIIIB).

Closely following the Rajput period, the Sultanate period at the site exhibits certain new features. The reuse of old bricks and the structures mostly of brickbats laid in mud mortar was widely noticed. The fortification wall of this period was built by using brickbats and remains of stone structures including sculptural pieces and architectural fragments belonging to earlier periods. The fortification wall was built by making parallel walls and the portion in between was filled with brickbats and fragments of sculptures and architectural members belonging to earlier periods.

The pottery of this period includes same types as found in the previous season. The important antiquities are terracotta bull, a decorated ram; the bull figurine is decorated with bands having pinhole around neck and transverse holes above the mouth. Besides, beads of terracotta and

semiprecious stones, iron and copper implements, copper coins and miscellaneous objects of terracotta and stones were found.

The excavation in Mughal levels have revealed details of house plans, street arrangements and other associated features. In the northern portion of the mound (TSR-I), a long north-south oriented street was exposed upto the length of 36 m. It was flanked on its either side by many house-walls some of which were provided with entrances directly communicating with it. At one place, the street was joined by a lane 152 m wide coming from west. Towards the northern end of the street, a house-complex with a brick-paved courtyard, 9.17 m long, was exposed in front of two adjacent rooms provided with drainage arrangement; the floors of rooms were found paved with complete bricks (pl. IX A).

In the southern portion of the mound (TSR-3), besides bringing to light further details of partially-exposed houses, the excavations this year have revealed a large drain sloping towards the south and joined by other smaller drains from the houses (pl. IX B). A little further south of the drain, where house-complex was previously exposed, one more room with paved-floor was laid bare. On the south-western comer of the room was found a human skeleton buried in a grave in north-south direction without any grave goods. It is likely that the skeleton belongs to the later period. Similar graves of both male and female including those of the children, have already been reported from other excavated areas of the mound most of which belong to later periods.

In TSR-I, on its eastern side, remains of a *hauz,* fallen chunks of walls showing pottery drain pipes forming part of a *hammam-complex* were clearly visible on surface. The excavation in this area gave interesting information about these Mughal structures. The *hauz* (pl. X) was square on plan, each side measuring 485 m. It was 080 m deep and had been originally provided with a central fountain possibly of copper. There were four outlets in the centre of each wall of this *hauz.* The original fountain was found missing; it was connected from below with a pipe, nearly two metre below the base of the hauz. Water was brought perhaps from the east and was channelized from the northern outlet of the *hauz* passing through the walls serving as the causeways. It is not unlikely that water from the channels on other sides also was channelized in identical manner. This, however, needs to be verified. A special feature of the *hauz* was the provision of flight of steps on the north and the south, and iron loops. On present showing, it is quite likely that the *hauz* may have formed part of a garden-complex.

A little to the north-east of the *hauz,* was another structural complex with conduit pipes running through its walls and may also have been part of a *hammam* complex. Excavations in this area have exposed a rectangular cistern measuring l0x 5.65 m with walls 0.25 m in height. On the floor of the cistern were four holes, one in each comer and an additional one in the centre. Immediately to the east of the cistern were found a few fallen chunks of walls, perhaps forming part of some rooms attached to the cistern, all having pottery pipes passing through them. The purpose and interrelationship of these structures exposed immediately to the west of the cistern, remains to be ascertained. The pottery found in the area is of the Mughal period.

Among the antiquities of this period, the important ones are terracotta human and animal figurines which include bull, horse, a camel, a monkey, tortoise, a couchant dog with head turned backwards (pl. VIID), humped bull some with applied neck band with dotted design and birds and a dancing peacock. The human figurines comprise few male heads with Turkish cap, some with hollow cylindrical body in the form of a pedestalled cup and cylindrical-shaped female figurines. Besides copper coins and implements of copper and iron, beads of terracotta, glass and semi-precious stones, household utensils of stone and other material were also found.

HIMACHAL PRADESH

26. EXPLORATION IN DISTRICT MANDI.— In the course of village-to-village survey, Teeka Ram of the Chandigarh Circle of the Survey explored several villages in Tehsil Karsog of the district. The site which is of archaeological interest was the Somesvara Mahadeva temple in the village Thakarthana.

27. EXPLORATION IN RAMPUR BUSHAHAR, DISTRICT SHIMLA.— In the course of problem-oriented survey, Hari Manjhi, Jasmer Singh, Baldev Singh, Teeka Ram and R. K. Sapru of the Chandigarh Circle of the Survey surveyed thirty villages in the tehsil. The sites which are of archaeological interest are as under:

Tehsil	*Village/Site*	*Nature of remains*
Rampur	Dansa	Ancient temples (datable to tenth-eleventh and eighteenth century) and miniature shrines (eleventh century)
-do-	Dattanagar	Temple dedicated to Dattatreya, probably built during AD 1803-15; relics of an ancient temple (belonging to ninth to twelfth century AD; ancient site (first century BC)
-do-	Ganwi	Temple in Pagoda style dedicated to local deity
-do-	Nirath	Ancient Sun temple
-do-	Rampur	Temple (datable between seventeenth and early nineteenth century)
-do-	Sarahan	Temples (datable to late seventeenth century

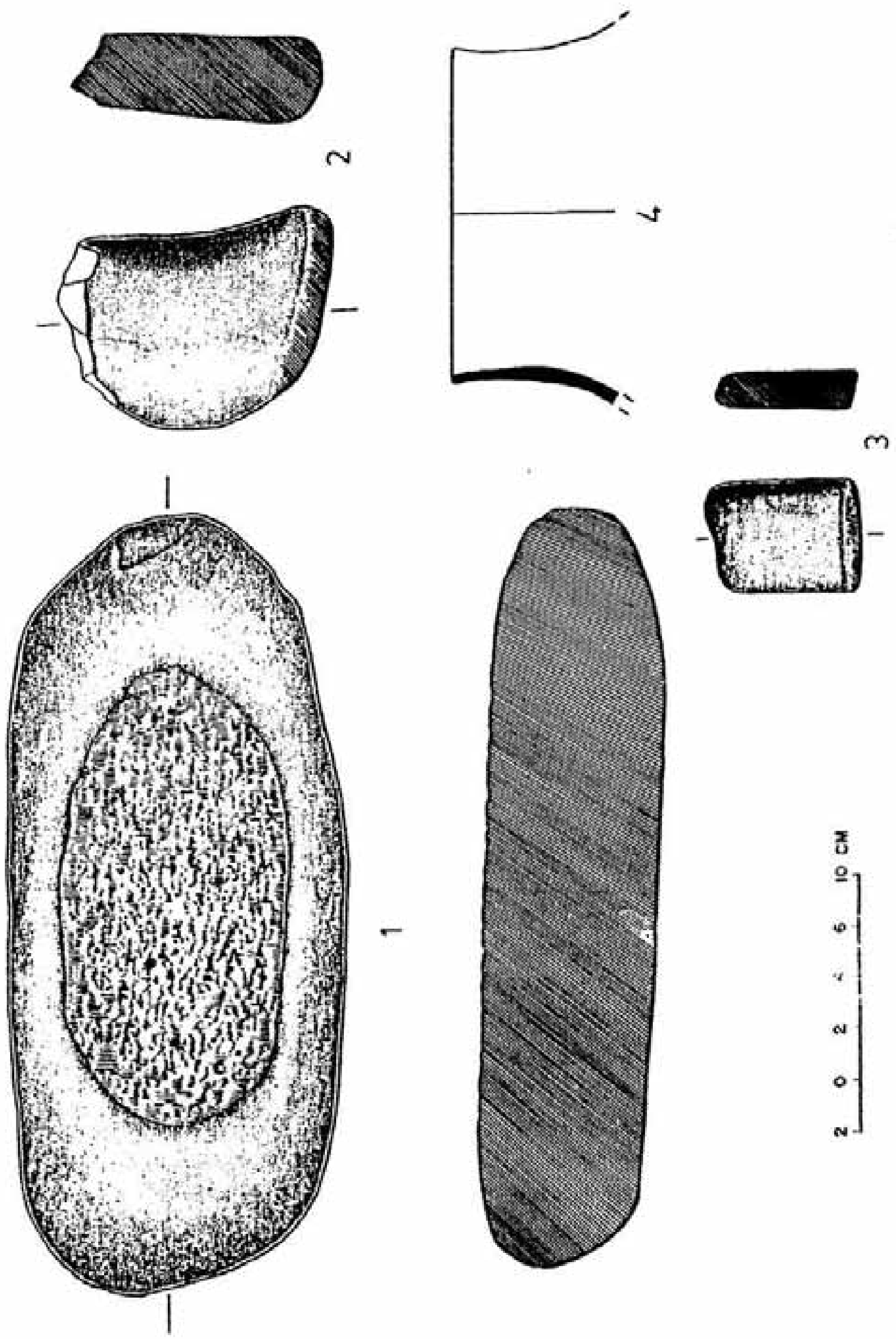


FIG. 2 *Kiari* stone objects

JAMMU AND KASHMIR

28. EXPLORATION IN DISTRICT LEH (LADAKII).— In continuation of last year's work *(1988-89,* p. 28), the Prehistory Branch of the Survey under the direction of S.B. Ota, assisted by S.K. Lekhwani, N.G. Nikosey, N. Taher, R.K. Dwivedi, K.M. Girhe and V.W. Pathak undertook further exploration and excavation in the Ladakh region with a view to find out early human habitation in the upper Indus Valley. Investigation was confined to the area between village Gaik and Kiari along the bank of the Indus where terrace sections are exposed due to road cutting. It is a narrow valley at an average altitude of about 3,900 m from the MSL. During the course of investigation, two sites have been located, one at Kiari and the other at Gaik where limited digging was conducted to ascertain the nature of the cultural remains.

The site at Kiari is located 2 km short of the present day village on the left bank of the Indus. At this locality, major portion of the cultural debris has already been destroyed during laying of the road. Excavation has yielded the evidence of successive hearth activity, a good amount of faunal remains, few potsherds, a burnt clay ball, and stone objects comprising saddle quern, pestle and a burnisher (fig: 2). Pottery is handmade red ware with light brown slip on the outer surface, medium fabric and well fired. So far only one shape has been identified which is a high-necked vase having featureless rim and concave at the neck position.

Faunal assemblage from this site mostly comprise *Bos* sp., *Capra* sp. and small ruminants Majority of the bones are charred and on few cut marks have also been noticed. The 100 F/P2O5 ratio obtained from two specimens is 068 and 036 which show a higher ratio than Neolithic Burzahom and Gufkral.

The site at Gaik is located about 525 km from Gaik TCP on Gaik-Kiari road on the right bank of the Indus. Here, apart from the evidence of a hearth, no other cultural find could be noticed.

Keeping in view the evidence obtained from both these sites it may be postulated that these settlements are purely seasonal in nature and probably occupied repeatedly at suitable locations on the bank of Indus. The economy was mainly based on pastoralism. In the light of these evidences, further investigation in the area is suggested.

29. EXPLORATION IN DISTRICT RAJOURI.— in continuation of previous year's work *(1987-88,* p 32), S.N. Kesarwani of the Srinagar Circle re-surveyed some of the Mughal *sarais* on the Mughal route in District Rajouri. Amongst them the *sarai* at Naushera is worthy of attention. It is more spacious and. differs from others in its general lay out and composition. It comprises two enclosures one within the other. The outermost enclosure has double-storeyed bastions at the comers and are crowned by the crenellated battlement. It also contains row of alcoves. An imposing gateway in the middle of the western wall provides an access to the *sarai.* The residential complex lies in south-west corner of the enclosure wall. It consists of a quardrangle of arched cells facing a common courtyard and is similar to the other *sarais* of the same period. Opposite to the main gateway is the Shahi mosque which is still under use. The complex was built by emperor Akbar.

Chingas, about 23 km from Naushera, is historically renowned for containing mortal remains of emperior Jehangir who died on his way to Lahore from Kashmir. The *sarai* at Chingas is well planned and has apartments, i.e., residential complex and an open courtyard. Both the structures have separate gateways but are interconnected with each other. The residential complex is built within a walled enclosure. It contains number of arched cells having openings. The facade of the gateway is simple. In the centre of the residential complex lies a small mosque with three arched openings.

Nadpur Sarai is about 10 km from Naushera. It is a single-storeyed building and was used as a halting station by the travellers during Mughal period. It consists of a spacious rectangular courtyard having a walled enclosure with crenellated battlement and is entered through imposing gateway on the east. The facade of the gateway has alcoves at the base and is adorned with recessed panels.

The *sarais* at Naryan and Dharmshala are in a dilapidated condition. Both are similar in plan. The *sarai* at Dharmshala is under use by the local people. It is a small-sized double-storeyed building having main gateway on the western side and bastions at the corners. It contains the *samadhi* of Baba Lai Chand. Besides, a Hindu temple dedicated to Vishnu is also of significance. It is now under worship.

30. SCIENTIFIC CLEARANCE OF BRICK STRUCTURES AT KIRAMCHI, DISTRICT UDHAMPUR.— During the course of conservation work at Kiramchi, a brick wall was encountered. To assess its nature and character, systematic scientific clearance was undertaken by the Srinagar Circle of the Survey under the direction of R.C. Agrawal assisted by A.K. Pandey, Puran Singh and B.S. Jamwal. The wall which was running in east-west direction and measuring 30 metre long was 1 ½ metre high. This wall was found hidden inside the temple platform on the southern side. To ascertain the actual nature of the brick wall and its relation with the temple building activity, the brick structure was thoroughly exposed and its extent was traced by laying trenches further south of the brick wall. In all, four trenches were laid and in all the squares, irregular brickbat floors ascribable to the Gupta period were encountered. The major portion of the floor levels was either found missing or robbed. In the course of exposition of flooring and the brick wall, a good number of moulded bricks, triangular and wedge-shaped bricks were also encountered. The standard size of bricks available is 6 x 12 *x* 24 cms. The above discoveries and the find indicate that the temple building activity started at Kiramchi sometime in the fourth-fifth century AD.

During the course of this small excavation, terracotta human and animal figurines, terracotta arecanut-shaped beads, balls, dabbers, iron arrowheads, nails, chisels and circular and rectangular copper coins were found.

KARNATAKA

31. EXPLORATION IN DISTRICT BI-:LGAUM.— P.S. Sriraman of the Bangalore Circle of the Survey explored the submergence area under the Markandeya River Project in the Belgaum and Hukeri

taluks. The exploration in the area (1085 Ha.) located in the narrow valley of the river brought to light loose sculpture of Vishnu, a hero-stone, and a *naga* stone at Gutti (16°21' N; 74°39' E) all belonging to later Chalukyan period. At the same place a medieval fort was located at the top of a hillock. At Nandi (15°58 N; 74°36 E) fragments of an inscribed slab were noticed which may be ascribed to *circa* twelfth-thirteenth century.

32. EXCAVATION AT HAMPI, DISTRICT BELLARY.— In continuation of the last year's work *(1988-89,* pp. 30-31) the Hampi National Project of the Survey under the direction of K.P. Poonacha, assisted by K. Veerabhadra Rao, C.S. Seshadri, M. Loganathan, T.P. Balakrishna Unnithan, Anandateertha, V.N. Joshi and Naomi Snehalatha resumed excavations at Hampi in the area between the Royal Enclosure and the Hazara Ramachandra temple complex and the area east of the Mint enclosure with an objective to lay bare the disturbed structural complex and to ascertain their relationship with the structures already exposed in the so called Ranga Mahal complex.

Excavation in the area south-east of the Hazara Ramachandra temple revealed rubble structures with an east-west orientation (pl. XIA). There was also a row of pots filled with ashy materials in the trenches. These pots, buried within the structures at a distance of 2.20 m to 2.50 m from each other, also had the same east-west orientation (pl. XIB). They were probably used for storage purposes. They were buried after cutting a pit and lining it with rubble so that the pot could be held in firm position without being crushed.

A fully intact skeleton of a horse was found in the south-eastern comer of the same enclosure at a depth of 0.95 m. North of this, another skeleton of a horse was also found. While the well preserved one is lying in east-west orientation with the skull on the eastern side, the second lay in north-south orientation with the skull on the northern side and was found badly damaged. These and other bone fragments belonging to sheep/goat, and birds were found associated in a layer of ash on the eastern side. A grinding stone found here along with soot, charcoal and ash suggest that the keepers of the animals were also staying here.

Altogether three distinct structural phases were noticed here. To the first phase may belong the rubble structures in a row in the east-west orientation and the underground water carrier covered with stone slabs. The stone platforms, characterized by moulded, large granite blocks; on the northern and southern sides of the enclosure along with the structures built above, belong to the second phase. In the third phase these earlier structures were covered upto the level of the shallow stone trough for supplying drinking water to the animus. This open courtyard, bounded by the northern and eastern walls of the enclosures was probably meant for depositing personal belongings including mounts rode by visitors before entering the complex. Similar shallow trough without any evidence of habitation but with skeletal remains of an elephant were also found north of the Hazara Ramachandra temple just outside the entrance.

The antiquities unearthed in this area include rusted iron nails and rings, copper coins, a pearl, a forehead ornament (?) and a fragmentary sandstone plaque depicting a hero. The forehead

ornament made of terracotta (?) and studded with thin rubies probably formed part of the bridle of a horse. Traces of gold foil on it can also be seen here and there.

Excavation in the area east of Mint enclosure revealed that there was a rammed flooring nearly a metre below the foundation level of the entrance and that the exisitng one was constructed after filling up this area besides bringing to light four steps of the basement of the *mandapa* on the northern side. The basement on either side of the central passage is decorated with *yali* figures. The *mandapa* is badly damaged probably due to setting of fire and the western portion of the *mandapa* as also the side walls of the gateway are collapsed.

Excavation south of this area, adjoining the partition wall of the Mint has revealed structures belonging to the earliest phase as also an underground soil 2 m long and 1.95 m wide with a depth of 4.40 m. The silo, cut into the yellowish granite gruss, is lined with roughly cut granite stones to prevent falling in of the sides. There is also a fine limeplastered flooring adjoining a soakage pit that directly rests on the gruss.

At the western end of the wall bifurcating the Mint into northern and southern portions, two water carriers were found. On the northern side, a pillared *mandapa* was exposed with rooms behind. The available evidence of pillar bases in a row strengthen this view. The last structural phase is indicated by remnants of plastered flooring on the western side. There is also a flight of steps with balustrades on the southern side.

The antiquities retrieved include a gold leaf, lead ingot cooled in the furnace itself with biconvex sections, a copper bell, nails, hooks, linch pins and rods all of iron, which are badly rusted. The lead ingots were probably meant for the lead shots, commonly used in the muzzle loading guns. Lumps of iron slag embedded in them were also found indicating smelting activities in the neighbourhood, but no furnace was encountered.

33. EXPLORATIONS IN SHORAPUR TALUK, DISTRICT GULBARGA.— As part of his comprehensive study of the archaeological sites of the Hunsgi-Baichbal valleys, belonging to the stone age, protohistoric and historical periods. K. Paddayya of the Deccan College Post-graduate and Research Institute, Pune, continued his explorations during this field season and brought to light several new sites.

Two new Acheulian occupation sites (Locality III at Sadab ad Locality VII-A at Fatehpur) were discovered in the Baichbal valley. At Sadab-III, over one dozen artifacts of limestone and quartzite (cleavers, handaxes, knives, cores, flakes, etc.) were found on a loose colluvial gravel patch overlain by black soil measuring up to one metre in thickness. The Acheulian artificer obviously exploited the gravel as source of raw material. At Fatehpur VII-A, lying on the right bank of the Fatehpur *nullah,* a trench measuring 45 x 4 m was dug by the local farmers up to a depth of 25 to30 cm in a field in connection with the preparation of a field embankment. Below 20 to 25 cm thick brownish soil a regular Acheulian horizon was encountered on the surface of weathered granite-gneiss. The horizon (about 10 cm thick) yielded over 50 artifacts of granite and dolerite. These included

handaxes, cleavers, chopping tools, knives,, cores, flakes, etc. This locality is a very good example of an Acheulian occupation site found on bedrock.

Middle Palaeolithic sites of the primary type at Gundalgera and Arikera were also located. The former site was found on the slope of shale-limestone tableland, while at Arikera the artifacts were found on an uncultivated, stony strip of land in the foothill region. At both these sites quartzite was the chief raw material, and the artifact types included scrapers, small handaxes, chopping tools, cores, simple flakes, etc. A small Mesolithic site lying about a kilometre south of the famous ashmound at Kodekal was also discovered. Here a small quantity of artifacts of chert and dolerite (fluted cores, simple and blunted blades, large flakes and discoidal artifacts of dolerite) were found on the banks of a minor hill stream.

Paddayya also brought to light two ashmound localities lying about a kilometre southwest of the village of Bohnal. Both are located on agricultural lands. On account of ploughing activities ash no longer occurs as mounds, but soft powdery ash deposits measuring up to 30 cm in thickness were observed in the fields. These ash deposits were found mixed up with true habitation deposits. Cultural material comprising greyish and red pottery, polished stone tools, chert artifacts and animal bones was found at both these localities. Fresh explorations at the previously known ashmounds of Budihal, Kakkera, Thanmadi Thanda, Malnur and Kodekal revealed extensive habitation area around the ash formations. Contrary to F.R. Allchin 's earlier interpretation of these sites as Neolithic cattle-pens, it now seems possible to treat them as stations of periodic cattle congregations which served a variety of purposes including exchange of materials, finished products and information.

At Arikera a megalithic burial site was discovered. It occupies a stony patch of land at the foot of Iime-stone-shale plateau and has preserved over 50 cist -burials with a passage chamber. Several of the burials have been subjected to treasure-hunting by the earth-moving workers of the Upper Krishna Irrigation Project.

34. EXPLORATION IN DISTRICT KOLAR.— In continuation of last year's work *(1988-89,* p. 33) explorations in the Mulbagal taluk, P.S. Sriraman of the Bangalore Circle of the Survey recorded the following antiquarian remains:

Village/Site	*Latitude/Longitude*	*Nature of remains*
Amblikal	13°13 35 N 78°26 33 E	Habitation site yielding early historical pottery, uniseribed hero-stones of circa tenth century
Arahalli	13°13 22 N 78°21 14 E	Megalithic burials (?)
Baiyapalle	I3?7 33 N 78°30 59 E	Megalithic stone circles

Village/Site	*Latitude)'Longitude*	*Nature of remains*
Balasandra	13°45 N	Kannada inscription of *circa* sixteenth century;
	78° 25 30 E	bastion of late medieval period Inscribed hero-
Bangawadi	13°16 30 N	stone of *circa* tenth century; temple in Vijaya-
	78°30 E	nagara style Temple of *circa* thirteenth century
Bevahalli	13°12 8 N	in late Chola style
	78°20 E	
Budideru	13°15 10 N	Early historical (?) site
	78°30 10 E	
Chikkur	13°15 16 N	Early historical pottery - scatter loose sculpture
	78°29 10" E	
Dasarallahalli	13°15 N	Inscribed hero-stones of *circa*
	78°29 E	tenth century, *matrika* sculptures
Dodda Hattihalli	13°17 51" N	Megalithic stone circles
	78°29 44" E	
Duggasandra	13°14 N	Inscribed hero - stones and inscription of *circa*
	78°22 E	tenth century, *matrika* sculptures in Chola style, hero-stone of medieval period
Gajjanahalli	13°14 N	Inscription, temple and hero - stones of post-
	78°22 E	Vijayanagara period
Gollahalli	13°15 25 N	Hero-stones of post-Vijayanagara period
	78°23 E	
Haranaya-	13°15 N	Fortification of post-Vijayanagara period
kanahalli	78°23 20 E	
Iragamutta-	13°14 N	Fortification of post-Vijayanagara period
nahalli	78°20 30 E	
Kadenahalli	13°14 43 N	*Matrika* images
	78°3O 50 E	
Kerasamangala	13°13 N	Megalithic burials *(1), matrika* images in late-
	78° 31 E	Chola style
Kodahalli	13°16 N	Fortification of post-Vijayanagara period
	78°33 45" E	
Kottavuru	13°16 N	Temple, sculpture of Vishnu
	78°29 E	

Village/Site	*Latitude/Longitude*	*Nature of remains*
Kottur	13°6 N 78°30 31 E M e	Megalithic stone circles
Kurubarahalli	i3°13 46 N 78°29 46 E	Megalithic stone circles
Kurudamale	13°12 40 N 78° 22 3 E	Temples of late-Chola period and style
Mallapura	13°8 N 78°30 E	Temple of medieval period, sculpture of Durgi
Manighattahalli	13°16 15 N 78° 35 E	Inscribed hero-stone of *circa* tenth century
Minichinahalli	13°4 27 N 78°10 20 E	Megalithic stone circles
Mudigiri	13°11 48 N 78°31 55 E	Habitation site of early historical period, inscribed hero-stone of *circa* tenth century
Naganahalli	13°15 52 N 78°30 18 E	Megalithic stone circles
N. Venkatapuram	13°11 20 N 78°31 30 E	Megalithic stone circles
Oddipalli	13°17 15 **N** 78°27 45	Hero-stone of *circa* tenth century
Pedduru	13°14 36" N 78°32 16 **E**	Habitation site of medieval period, inscription of Chola period
K. Ramachan-drapura	13° 8 N 78°30 45 E	Inscribed hero-stone *of circa* tenth century, *matrika* images
Sangasandra	13°13 N 78°24 45 E	Temple and inscriptions of medieval period
Sattanur Bisanahalli	I3°17 20 N 78°22 3 E	Inscribed hero-stone of *circa* tenth century
Tavarekere	13°14 15 N 78°23 E	Habitation site of early historical period, inscribed and uninscribed hero-stones and temple of *circa* tenth century, sculptures of Bhairava, Chamunda, Kumara and Surya, medieval inscription
Valuvahalli	13° 13 N 78°27 30 E	Inscribed hero-stones of *circa* tenth century, *matrika* images

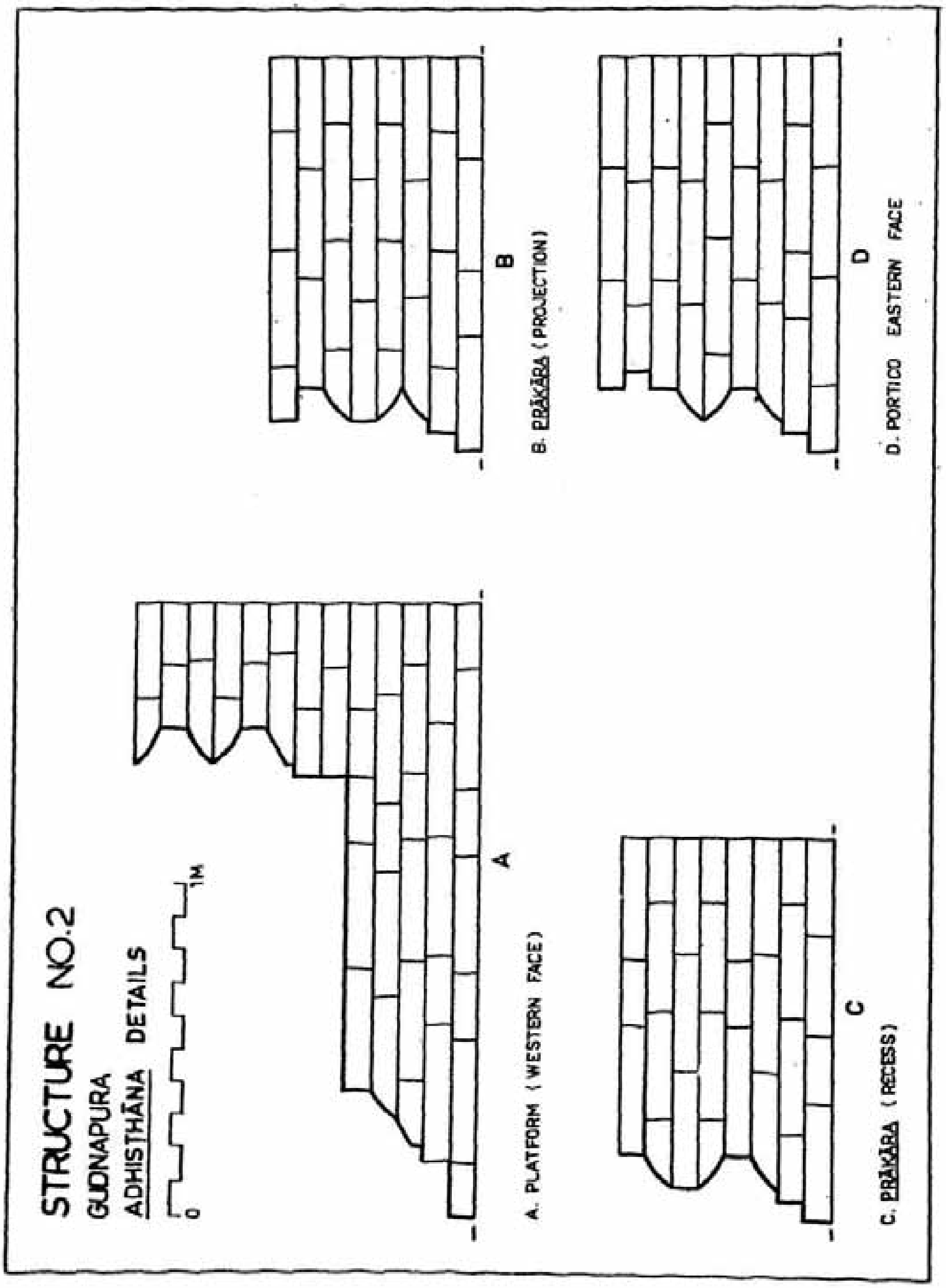

STRUCTURE NO.2
GUDNAPURA
ADHISTHĀNA DETAILS
0
1M
A
A. PLATFORM (WESTERN FACE)
B
B. PRĀKĀRA (PROJECTION)
C
C. PRĀKĀRA (RECESS)
D
D. PORTICO EASTERN FACE

Fig. 4

35. EXCAVATION AT GUDNAPUR, DISTRICT UTTARA KANNADA.— In continuation of the previous seasons's work *(1988-89,* pp. 36-39), the Bangalore Circle of the Survey under the direction of KP. Poonacha, assisted by S.S. Nayak, M.V. Visweswara, C.S. Sheshadri, S.G. Samak, T.P. Balakrishna Unnithan and M.V. Mallikarjuna resumed the excavation at the early medieval site (fifth-sixth century AD) at Gudnapur with the objectives of (i) exposing the complete plan of the buried structures; (ii) ascertaining the pattern of lay-out, constructional methods and possible functions of the structures; and (iii) identifying the structures exposed with those mentioned in the Gudnapur inscription of the Kadamba king Ravivarma *(circa* AD 485-519).

Excavation continued in the south-western part of the mound revealed that the brick structure (STR-I) exposed earlier *(1988-89,* pp. 37-39) was in fact originally a rectangular hall (10.9 m N-S x 2.10 m E-W) with an entrance from the east. Subsequently, partition walls (0.45 m wide) of laterite blocks were raised to form five rectangular rooms, the largest being the central one (3.40 m N-S x 2.10 m E-W).

This rectangular hall was provided with an open pillared verandah (10.90 m x 1.40 m) having moulded *adhisthana* on the eastern and western sides and brick-paved passage on the north and the east. The width of the passage on the north is 1.30 m and on the east it extends beyond 280 m. Since the mound slopes towards south and west, the peripheral walls of the structure are much damaged. Work is in progress to expose the complete plan of the structures in this area.

Further excavation north of STR-I in an area of 1000 sq m in front of the present Virabhadra temple, laid bare the complete plan of a most imposing structure (STR-2) entirely built of burnt bricks. This east facing structure (fig.3; pl. XII A) occupies the central portion of the complex and on plan has two chambers and an entrance porch. Of the two chambers, the western is squarish (3.30 m E-W x 3.35 m N-S) and the eastern is rectangular (5.9 m E-W x 3.35 m N-S). It is surrounded by a low platform, a spacious brick-paved courtyard, all enclosed by a *prakara* having a pillared verandah and a portico on the east.

The platform surrounding the chambers has moulded exterior and rises in two stages (fig. 4; pl XIIB). The lower, 0.50 m in height, serving as an *upa-pitha,* has a uniform width of 0.22 m on the northern and southern sides and projects respectively to 1.00 m and 1.75 m on the west and east. The second stage, extant to a height of 075 m, is more elaborate comprising eight mouldings. The maximum width of this platform is 120 m on the northern and southern sides but reduces to a mere 0 75 m on the east and 50 cm on the west. The extension of the platform on the eastern side and the provision of flight of steps indicate the existence of a square entrance porch on the east. The peripheral squarish post holes traced at regular intervals suggest that the platform having slopy, tiled roof supported by a dwarf wooden pillars served probably *as pradakshinapatha.* It is approached by entrances on three sides. The eastern main entrance has three flights of steps (1.40 m wide). While the northern entrance leads to the platform from west, the southern entrance is approached from east Both are narrower in width (50 cm wide) and have a *chandrasila* with peripheral design of lotus petals.

A brick-paved open courtyard surrounds the structure proper. The pavement encompasses an area of 4 m on the north, 4.20 m on the south, 4.70 m on the west and to a maximum of 10.20 m towards east. The present Virabhadra temple rests on the debris accumulated over this brick pavement.

The *prakara* built of 0.75 m wide wall, encompasses a total area of nearly 636 sq m. It is interesting to note that the outer surface of the *prakara* walls is plain whereas the inner surfaces (facing the structure proper) are moulded. If the inner surfaces of the eastern and western walls are moulded throughout their length, the northern and southern walls have them only at the middle portion. Offsets, in low relief, are provided on the north-eastern and south-western parts of the eastern wall. They are formed by two projections of 0.75 m width receding inwards by 0.10 m. Significantly, the mouldings of the *adhisthana* differ in the projected portions the recessed portions having the same mouldings as that of the remaining part of the wall. A number of regularly paved squarish (0.20 x 0.20) post-holes noticed on the eastern side of this wall along with another wall running parallel to it at a distance of 2.65 m suggest that there existed a pillared verandah on the east. It probably had an entrance on the east. The floor of the verandah is not paved. At the northern and southern extremities of the verandah two rectangular rooms (3.20 m E-W x 2.30 m N-S) are formed by raising walls. Beyond the pillared verandah existed probably a narrow portico, the extant portion of which measures 0.70 m in height ,comprising eight moulded courses.

Both STR-I and II had channels covered by stone slabs for draining out the rain water. The method of construction incorporated in these structures is interesting. The main walls running in a particular orientation are built first and the bifurcating walls at right angles are raised later, without giving any bonding. Perfect bonding is seen only in the four corners of the main part of STR-2, Maximum care however has been taken to minimise the gap between two consecutive courses of bricks and the junction between the two walls.

The extension of excavation upto the present Virabhadra temple clearly indicated that it is a post-Kadamba structure. Major part *of the sabhamandapa* of the temple rests over the southern half of the brick-paved courtyard of STR-2 and the southern arm of the *prakara* continues below the present temple.

Besides the above main structures, a number of walls built of laterite blocks and bricks not conforming to any specific plan were also encountered in the excavation. Further work to ascertain their complete plan is in progress.

Ceramics unearthed from the excavation resolve into two distinct wares, viz., polished red and red slipped ware and fine grey or light greenish ware. The types represented in the former are sprinklers, spouted vessels, bowls, and miniature vases as also some big storage jars with profuse decorations. Concentric circles, hatched bands, twisted rope, punched designs and lotus petals affixd by applique method are some of the common decorative motifs used (pl. XIII A), Important among the grey ware types are medium-sized pots with flared and out-turned rims, straight-sided bowls, storage jars, and variety of lids and platters. Besides the above wares, a few sherds of late medieval

black ware and red ware were also been found in the uppermost levels.

A large number of flat and curved tile pieces with holes and projections were also retrieved from the excavation. The flat tiles have right-angled projection at one end and the other end is fashioned in a variety of shapes, viz., pointed, multi-cusped, angular, etc. The angular ones have multiple holes for fixing them on wooden rafters using iron nails which were also encountered in considerable numbers.

The excavation yielded good number of antiquities of stone, metal and terracotta. Among the stone antiquities the image of Parsvanatha, broken into two parts, is noteworthy. Head and body fragments of the Jaina Tirthankara images, *naga* hoods, decorated but fragmentary architecutral members, uninscribed *nishidi* stone, all fashioned on basalt and small marking rods of soapstone are the other stone antiquities retrieved.

Ornaments of silver, stamped (coin ?) or unstamped roughly circular ingots, wires, rings and foils of copper (pl. XIIIB), bronze objects used in worship (pl. XIIIC), a variety of nails and other iron objects constitute the important metallic antiquities.

Among the other noteworthy antiquities mention may be made of fragmentary human and animal figurines of terracotta, beads of terracotta and glass, hopscotches, decorated spouts and glass bangles.

KERALA

36. EXPLORATION IN DISTRICT CALICUT.—Muhammed K. K. discovered two rock-cut tombs with single benches and central shaft in Koduvally and Kizakoth villages in the District. Besides these, *two-topikals* and a number of urn burials were also noticed in both the above villages.

37. EXPLORATION IN DISTRICT MALAPPURAM.—– Muhammed K. K. discovered a dolemenoid cist in Pattappiriyam village. In one of the disturbed burials, bronze vessels notably jars, vases, bowls, lamps and knobbed lids could be noticed. Other important items in the grave furniture are sickles, javelin heads, knives of various sizes and a tripod.

38. MEGALITHIC BURIAL, VALIYAPADAM, DISTRICT QUILON.— During an excavation at Valiyapadam in Quilon district P. Rajendran, a U.G.C. Research Scientist in the Department of History, Kerala University, discovered Megalithic pot burials, besides pottery and iron implements.

During the excavation, two rock slabs measuring 85 x 85 cms were found three metres apart at a depth of 60 cms in the lateritic gravel. Several iron implements were found above the rock slabs and comprise of knife, axe, daggers and zoomorphic forms (pl. XIV A). The rock slabs are placed above two big pots which are 90 cm in height and have a circumference of 75 cm at the top. The middle portion of the pots is 90 cm in diameter and the bottom tapers down to a conical form. The pots are thick and it is partly baked with finger mark impressions on the exterior near the mouth.

Except earth no other remains were found inside these jars. Several small black and red ware sherds were found around these jars at a depth of 80 cm; unlike the bigger pots these are well fired, and both were wheel made.

39. MEGAUTHK: URN BURIALS, PQREDAM, DISTRICT QUILON.— P. Rajendran, U.G.C. Research Scientist in the Department of History of Kerala University, discovered megalithic remains at Poredam near Chadayamangalam. The evidence includes thirty-five pots of various sizes, iron implements and child bones. The pottery was found upright at a depth of 15 to 2 metres within the lateritic clay. Some of the bigger pots were closed with rock slabs while the smaller ones were placed near the bigger ones. In one of the bigger pots an iron axe was found along with a small sickle. A few fragile bone pieces, which seem to be child's limbs were found in another pot.

The bigger pots had a wider mouth and their bottom tapers downwards from the middle. These have thick section and are made with lateritic soil. The smaller pots which are found near the bigger ones is the typical Black-and-red ware pottery of the Megalithic culture. The smaller pots were well-baked while the bigger ones were poorly baked. Both are wheel made and do not bear any decoration. The occurrence of only a few bones within the pot clearly shows that it was secondary burial.

40. NEOLITHIC REMAINS, MANTROTHURUTH, DISTRICT QUILON.—P. Rajendran, a U.G.C. Research Scientist in the Department of History of Kerala University, reported the discovery of a neolithic stone axe at Mantrothuruth (pl. XIV B). This is the first neolithic find from south Kerala.

MADHYA PRADESH

41. EXPLORATION IN DISTRICT DHAR.— Manual Joseph of the Bhopal Circle of the Survey discovered the following sites of archaeological interest:

Tehsil	*Village/Site*	*Nature of remains*
Badnawar	Amodia	Sculptures of Vishnu, Uma-Mahesvara, Varaha, Nandi, etc., of Paramara period
-do-	Balgara	Sculptures of four-armed deity, Siva *linga,* Nandi of Paramara period
-do-	Barichho	Sculptures and architectural fragments of Paramara period
-do-	Bamasa	Sculptures of Siva, Nandi, Sarasvati of Paramara period
-do-	Bamodia	Vishnu, four-armed deities of Paramara period

Tehsil	*Village/Site*	*Nature of remains*
Badnawar	Bhatbamanda	Two step-wells, Paramara period
-do-	Bhatkhareli	Ancient mound, Paramara sculptures and architectural fragments
-do-	Bhounda	Ancient mound, pottery and sculptures of Paramara period
-do-	Bhumpura	Step-well and architectural fragments
-do-	Bir	Wells and sculptures of Paramara period
-do-	Borali	Mound, Vishnu and other sculptures of Paramara period
-do-	Bukrawadakheri	Mound with pottery, Vishnu, Nandi and other sculptures
-do-	Changara	Sculptures of Mahishasuramardini, *jaladhari,* Nandi and architectural fragments
-do-	Chhotichho	Sculptures of Nandi, *jaladhari* and architectural fragments of Paramara period
-do-	Daulatpura	Ancient mound
-do-	Dhaniyakheri	Paramara sculptures
-do-	Diwaniya	Sculptures of Siva and Mahishasuramardini, architectural fragments of Paramara period and eighteenth century tomb
-do-	Dudwal	Sculptures
-do-	Golawada	Ancient mound with pottery, sculptures and architectural fragments
-do-	Jalod	Ancient mound with pottery
-do-	Kachnariya	Monument related to Tejaji *(circa* eighteenth century)
-do-	Kanwan	Mound with Chalcolithic pottery, sculptures and well
-do-	Kanwasa	Ancient mound with pottery, sculptures of Uma-Mahesvara, Ganesa, Vishnu, etc., of Paramara period

Tehsil	*Village/Site*	*Nature of remains*
Badnawar	Karariya	Monument related to Rejaji[1] (c. eighteenth century)
-do-	Karod Khurd	Ancient mound with pottery
-do-	Katalwada	Ancient mound with pottery of different periods
-do-	Kathoriya	Ancient mound with pottery, sculptures of Ganesa, Nandi, etc.
-do-	Khajuriya	Mound with pottery of different periods and well.
-do-	Khandigarh	Ancient mound and sculptures of Paramara period
-do-	Makni	Chalcolithic mound with different types of pottery; brick structure; and terracottas
-do-	Manasa	Ancient pottery and well
-do-	Masaniya	Sculpture and architectural fragments of Paramara period
-do-	Nowakhera	Medieval sculptures
-do-	Palwara	Ancient mound with Chalcolithic and other pottery, well and tomb
-do-	Paduniya	Ancient mound with pottery and Paramara sculptures
-do-	Rangarkheri	Structures of *circa* eighteenth-nineteenth century
-do-	Rithora	Sculptures of Kali, well
-do-	Rithori	Sculptures of Mahishasuramardini, Uma-Mahesvara, Nandi of Paramara period
-do-	Sanawada	Wells of *circa* eighteenth century
-do-	Sanoli	Sculptures, architectural fragments and inscription of Paramara period
Dhar	Bachanpur	Sculptures of Paramara period and step-well

Tehsil	*Village/Site*	*Nature of remains*
Dhar	Bachrawada	Step-wells, sculptures and sari-stones
-do-	Bagdi	Paramara sculptures and step-wells
-do-	Baneriya	Step-wells, sculptures and architectural members
-do-	Baykhera	Ancient mound, step-wells and sculptures
-do-	Bercha	Paramara sculptures and step-wells
-do-	Bhojapura	Paramara sculptures
-do-	Bilodakhurd	Step-wells
-do-	Borda	Ancient mound
-do-	Cherawad	Sculptures and architectural members
-do-	Chhapar	Step-well
-do-	Chor Bavadi	Step-well
-do-	Daulatpura	Step-well
-do-	Diglay	Ancient mound and Paramara sculptures
-do-	Gunera	Step-well
-do-	Gutkia	Step-well
-do-	Haldia	Sculptures of Ganesa, Hanumana, Narasimha and architectural fragments of Paramara period
-do-	Himmatgarh	Sculptures of Paramara period and sari-stone
	Ikalduna	Sculptures of Paramara period and well
-do-	Jamukheri	Sculptures
-do-	Kalamkheri	Sculptures and step-well
-do-	Kalsara	Sculptures and step-well
-do-	Kanawal	Sculptures of Paramara period
-do-	Karanjwa	Step-well and sari-stone
-do-	Karondiya	Sculptures and step-well
-do-	Khamla	Sculptures and step-well

Tehsil	*Village/Site*	*Nature of remains*
Dhar	Khanpur	Sculptures of Paramara period
-do-	Krariya	Ancient mound with pottery; sculpture
-do-	Maharajkheri	Step-wells
-do-	Mohanpura	Sculptures of Paramara period, brick structures
-do-	Mundla	Sculpture, step-well
-do-	Najikbaroda	Wells and *sati*- stone
-do-	Nayapura	Wells and architectural members
-do-	Nizampura	Brick temple
-do-	Patalyapura	Step-wells
-do-	Pipliya	Sculptures
-do-	Ratway	Sculptures and step-well
-do-	Sugdi	Step-wells of Indo-Islamic period
-do-	Shankarpura	Step-wells
-do-	Siloda Buzing	Ancient mound, step-wells, sculptures and *sati*-stone
-do-	Siioda-khurd	Sculpture
-do-	Silotya	Step-well
-do-	Ujjeni	Sculptures
-do-	Uttarsi	Well and mosque

42. EXCAVATION AT BALWARA; DISTRICT EAST NIMAR.— In continuation of last year's *(1988-89,* pp. 43-44) work, the Prehistory Branch of the Survey under the supervision of S.B. Ota, assisted by S.K. Lekhwani, N.G. Nikosey, J.S. Dubey, K. M. Girhe, R.K. Dwivedi, N.K. Nimje, C.L. Yadav, P.S. Pashine and P.C. Dogra resumed excavation in the main trench at Balwara (22°10'21" N and 76°31,'11 E) which had remained incomplete, the objective of this season's investigation was to understand the quarternary landscape and environment of the area. Therefore, 13 more test pits were opened at various places in the site. From the deposits noticed in these test pits, the following composite stratigraphical succession has been reconstructed.

The pre-Acheulian deposit is represented in the form of brownish grey to reddish colour sandy silt alluvium, which is locally derived, resting on Vindhyan or on weathered Deccan trap. The occurrence of this deposit is fan-shaped and confined to the site. It is a low energy sedimentation. The oxidisation of the sediment and the formation of pedogenic carbonates suggest a comparatively low rainfall during the deposition of this sediment.

Overlying the pre-Acheulian alluvium is the rubble horizon (colluvium) which is about 40 cm thick, associated with Acheulian industry. This rubble deposit is confined only to the pediment surface, which is locally derived from the hill slope due to surface run off. In the test pit dug in the depression, it has been noticed that the rubbles are partially to fully weathered and some with developed weathering rind upto 2 mm thickness. In contrast to this, the associated artefacts are absolutely fresh. This suggests that the deposition of rubble in the area started long before Acheulian occupation at the site. This rubble seems to have been slided down from the hill slope and got deposited in the depression. That is why the remnants of this early rubble formation is noticed resting on the bedrock only in the deepest trench. Except this, the usual rubble formation overlying the pre-Acheulian alluvium was formed alongside the Acheulian cultural deposit. The change of sediment from the earlier low energy alluvium to high energy colluvium suggests the change in climate, i.e., from low to high rainfall. Probably the congenial climatic regime during this period was one of the major factors for Acheulian man to occupy this area. During the Acheulian occupation at the site there are evidences of palaeo-channels and seasonal water pools in and around the site. The pool sediment which is basically of low energy shallow water pond origin has been noticed in the form of greyish and brownish clay, which is fissured. Palaeo-channels have been encountered with its bed gradient and knick points.

The implementiferous rubble deposit is capped by Narmada Older alluvium, which is preserved only in the palaeo-channels at the site. It suggests that during terminal Pleistocene aggradational phase of Narmada, the older alluvium of Narmada got deposited at the site through Pipalghati nullah and its tributaries. Exploration along Pipalghati nullah and Dharikotla valley has yielded the remnants of this older alluvium, thereby confirming the observation at Balwara.

The Acheulian horizon underlies the Narmada older alluvium in the palaeo-channels whereas at the higher level it underlies black clay sediment. Therefore, stratigraphically Narmada older alluvium is sandwiched between implementiferous rubble horizon and black clay deposit. In other words, black clay which is subsequent to Narmada older alluvium, is the last Quarternary sediment capping all over the site. It is compact, crudely laminated and fissured. At places this clay is impregnated with powdery carbonate of ground water origin. During the terminal Pleistocene aggradational phase when the Narmada was flowing at a much higher level, the mouth of tributaries like Pipalghati flowing to Narmada got choked up, resulting in rising of water level in the tributaries and nullahs. Since these nullahs drain the flat land of Deccan trap, they bring black clay sediment which is the weathered product from Deccan trap, as their bed load. Due to rising of water level in these streams the black clay sediment got deposited at a much higher level as overbank flood deposit spreading over the Acheulian horizon and Narmada older alluvium.

43. EXCAVATION AT SAMNAPUR, DISTRICT NARSINGHPUR.— In continuation of last year's work a team comprising V. N. Misra, S.N. Rajaguru and R. K. Ganjoo of the Department of Archaeology, Deccan College Post-graduate and Research Institute, Pune, carried out geo-archaeological and prehistoric investigations at the Middle Palaeolithic site of Samnapur (79° 07' 30" E; 23° 06 17" N)

district Narsinghpur. The site is situated at-the foot of a dolomitic limestone outcrop of the Bijawar Series on the north bank of the Narmada river, about 1-5 km away from the present river channel.

The 4 x 4 m main trench opened in 1986-87 and later enlarged to 8 x 6 m was dug down to sterile layer this year. The trench was divided into 1 m wide segments which were numbered H to M from north to south. Each segment was further divided into 1 m squares which were numbered 1 to 8 from east to west. Squares 7 and 8 in segments L and M were not excavated. Thus the total area excavated was 44 sq m. The archaeological horizon consisted of a rubble deposit of 50 -70, cm thickness and an area of 100 x 60 m. The rubble is buried under nearly 13 m of silt which has been considerably eroded, creating a badland topography and exposing a part of the rubble. The excavation was done in arbitrary spits of about 5 cm thickness each and the record of finds was kept in terms of 1 m squares. AH finds including artefacts, unmodified cobbles and fossil bones were plotted on graph sheets. Levels 1 to 7 were dug during first three seasons and layers 8 to 14 were dug this season. This year 950 artefacts were recovered, bringing the total artefacts recovered in all the four seasons to 3126. Typologically, the artefacts comprise (in the order of frequency) end flakes, flake cores, indeterminate flakes, worked nodules, side scrapers, blades, flake blades, knives, end scrapers, transversal scrapers, chips, notches, convex scrapers, side-cum-end scrapers, blade cores, double side scrapers, denticulates, convex scrapers, dejete scrapers, hammers, round scrapers, and borers. An interesting find was a large dolerite core and four flakes which could be conjoined.

Handaxes and cleavers are conspicuously absent in the entire assemblage. Essentially the assemblage consists of large flakes with sharp edges many of which are damaged due to use and/or trampling and pressure of the overlying deposit. Geologically, the rubble deposit containing the assemblage overlies a fissured clay unit and a reddish brown silt. Below the silt is a deposit of pebbly-cobbly gravel which is exposed in a well close to the site as also in the alluvial cliff along the north bank of the Narmada river. This pebbly-cobbly deposit contains a typical Acheulian industry. The Samnapur assemblage is therefore both stratigraphically and typologically post-Acheulian. Although it contains a small proportion of blades these are larger in size than the typical Upper Palaeolithic blades and are made by stone hammer technique. No typical Upper Palaeolithic assemblage has yet been discovered in the area, Microliths, however, occur on the surface of the Narmada alluvium in which the Samnapur .site lies buried. Thus on stratigraphic and typological considerations the Samnapur assemblage can be designated as Middle Palaeolithic. The predominance of flakes, low percentage of shaped tools, and comparatively large size of the artefacts all suggest it to be representing an archaic or early stage of the Middle Palaeolithic.

Majority of the artefacts are made on the locally available cherty quartzite, formed along the fault in the Bijawar Series. A smaller number of artefacts are made on Vindhyan quartzite and a few on dolerite. The last two rocks are not available in the close vicinity of the site. The nearest source of Vindhyan quartzite could be cobbles and pebbles in the upper reaches of the Richai nala and other ephemeral streams originating on the Damoh plateau about 10 km north of the site and in the Narmada bed. The nearest source of the dolerite is the Deccan Trap formation of the Jhira Ghati area about 25 km northwest of the site. Besides artefacts, isolated teeth of *Bos sp,* indt.

and bones of indeterminate vertebrates were found in several levels. Small nodules of red ochre were found in two squares in one level.

The Samnapur site stands out as an unique archaeological occurrence because it lies buried in a thick deposit of alluvial silt. Palaeolithic sites in fine-grained sediments are rare in India, the only exception being the sites in the Didwana region of Rajasthan. The restricted size of the archaeological rubble in a vast flood plain of fine-grained alluvium is intriguing. To understand the origin of the rubble and the incorporation of the archaeological material in it, we carried out extensive geomorphological survey, examination of sediments along the north bank of the Narmada river as well as in the gullies and nalas, and a study of ancient geological formations. Our observation from these studies can be summarised as follows.

The rubble is a misfit in the 23 m exposed alluvial sequence of the Narmada. It is absent in the overlying yellowish brown silt as well as in the underlying black fissured clay and reddish brown silt. The rubble does not show any variation in the proximal and distal facies. Its poor consolidation and conformable relationship with the overlying silt suggests that it was not exposed for a long time and was buried under the silt during an aggradational phase of the Narmada when the river was flowing a few metres above the present bed-level during the late Pleistocene. The rubble was formed largely by soil-creep processes. Freshness and high concentration of artefacts, lack of imbrication and the presence of mahuports imply considerble contribution by human agency in the formation of the rubble. The hominids probably contributed to it by bringing in suitable cobbles for manufacturing artefacts and other activities. The artefact assemblage associated with the rubble represents a semi-primary archaeological context. Its importance lies mainly in its occurrence within a thick finegrained alluvial deposit.

At the moment it is not possible to assign a firm absolute date to the rubble and the associated archaeological assemblage. However, a volcanic ash layer has been located on the Narmada about 10 km upstream of the Samnapur site. This ash layer occurs within alluvial facies which are stratigraphically equivalent to those containing the rubble at Samnapur. Ash samples from this layer are being processed for K-Ar dating at the Physical Research Laboratory, Ahmedabad.

Several factors seem to have been responsible for attracting Palaeolithic man to this site. First, the raw material for making tools was easily available in the form of blocks of cherty quarzite in the adjacent hillock and Vindhyan quartzite cobbles in the beds of Narmada and its tributaries. Secondly, the location of the site away from the Narmada channel and close to the hills provided relative immunity from the monsoon foods. There is no sedimentological indication that the site was subjected to recurrent and prolonged inundation during its occupation. And finally, the occupants had access to the plant and animal resources of the alluvial plain as well as the hills, both of which were probably as rich, if not more so, as they are today.

Two microlithic sites - one on the plateau of the Mrigannath hill, about 10 km northeast of

Samnapur village and the second two km west of Samnpaur village on he right bank of Richai nala in the forest close to the Jabalpur -Bhopal road were also located. The microliths from both sites are made on chalcedony and chert and comprise blunted back blades, lunates, and triangles in addition to simple blades and fluted cores.

44. ARCHAEOLOGICAL AND ETHNOGRAPHIC EXPLORATION IN DISTRICT S AGAR.— V. N. Misra, Malti Nagar and R. K. Mohanty of the Department of Archaeology, Deccan College Postgraduate and Research Institute, Pune, located a microlithic site on the western periphery of Chandarpura hamlet, 2 km northeast of Umrari village located 34 km south of Sagar town on the Sagar-Narsinghpur road. The microliths occurred on rocky ground. Made of chert and quartz, they comprised blunted back blades and lunates in addition to simple blades and fluted cores. A rich Lower and Middle Palaeolithic site was also discovered between Chandarpur hamlet and the S agar - Narsinghpur road, 1 -5 km northeast of Umrari village. The Palaeolithic site is located on cultivated land at the foot of the low basalt outcrop near the hamlet Artefacts in very fresh condition are found in dense concentration in the ploughed fields. Lower Palaeolithic artefacts are made of quartzite and comprise handaxes, cleavers, various forms of scrapers, flakes, blades and cores (pl. XV A). The nearest source of quartzite is near Umrari village and therefore the raw material was brought to the site from a distance. Middle Palaeolithic artefacts on the other hand are made of chert which occurs as veins in basalt outcrop. The artefacts comprise miniature handaxes, various forms of side scrapers, end scrapers, notches, denticulates, points, flakes, blades and cores (pl. (XVB). Both simple and Levallois flakes and cores are represented in the collection. The chert artefacts are generally patinated.

Data was also collected on the hunting techniques, technology, subsistence, social organization and religious practices of the Pardhi community in Chandarpura hamlet and Umrari village. The Pardhis are an essentially semi-nomadic hunting group although a few of them have acquired land and taken to agriculture. Majority of them, however, live a nomadic life for eight dry months of the year. During this period the males hunt small game as well as wild boar for their own consumption and also for selling to the village and town people. They use a variety of nets and traps, spears and occasionally guns for hunting and trapping. The females engage in selling jewellery and cosmetics to village women. During the rainy season the Pardhis return to their permanent camps when they repair their huts. Some of them also have a few heads of cattle and goats. In recent years the Government has been trying to settle them permanently by giving them house plots and agricultural land and loans for building houses, purchasing livestock and agricultural equipment and inputs. However, majority of the Pardhis prefer to practise their ancestral vocations of hunting and petty trade and living a semi-nomadic life.

45. EXPLORATION IN DISTRICTS SHAHDOL AND UJJAIN.—Narayan Vyas of the Bhopal Circle of the Survey discovered the following sites of archaeological interest:

District	*TaluklTehsil*	*Village/Site*	*Nature of remains*
Shahdol	Birsinghpur Pali	Belli and Jamulaipur	Sculptures of Kalachuri period, old fortress known as Zin-zingarh, rock-cut passage
-do-	-do-	Pali	Kalachuri sculptures
Ujjain	Ujjain	Asampura (Hasampura)	Microliths, temple remains and sculpture of Paramara period; inscribed brass images ranging in date from *circa* thirteenth to fifteenth century, ancient tank, ruined stone structure known as Ranikot
-do-	-do-	Chintaman	Sculptural remains of Paramara period, *baoli* (medieval period)

MAHARASHTRA

46. EXPLORATION IN DISTRICT AHMEDNAGAR. — In course of village-to-village survey in Sangamner Taluka, S.S. Parekh of the Aurangabad Circle of the Survey noticed the following antiquarian remains:

Village/Site	*Nature of remains*
Ashwi (BD)	Two medieval temples namely Amritesvara Siva temple and Vithala temple having an image of Vithoba. Residential building of Dastane called Harilbag Haniswada of the Maratha period built during the regime of Bajirao Peshwa.
Ouzar (KD)	Ruins of Siva temple with *linga* and Nandi of late medieval period.
Umbri	Late medieval. temple of Siva known as Sankatesvara with *Ekamukhalinga*

47. EXCAVATION AT BANOTIWADI, DISTRICT AURANGABAD.—Debris clearance of Dharkund caves was taken up by PJNF. Kamble assisted by J.M. Thapar, MR. Dhekane and SJL. Jadhav of the Aurangabad Circle of the Survey to understand the development of rock-cut architecture to western India. As a result of the removal of vegetation and loose soil, the pillars in front of the caves were exposed. The caves at Banoti, which are three in number, arc known as Dharkund caves. These comprise of the main hall with two sub-shrines and an incomplete circumambulatory passage,

antechamber and shrine and two cells to the north and the south respectively. There is no image of Buddha inside the main shrine. The door frame is elaborately carved with *mithunas and dvarapalikas.* On the lintel of the doorway, in the centre, is the representation of *dvarapalikas* accompanied with two female figures. The right side pilaster has a dancing figure on the medallion and other designs. Out of the four pillars in front of the cave three have dwarfish and *mithuna* figures. The pillars are contemporary with Ajanta/Ellora Buddhist caves. Architecturally, it represents the transitional phase of architecture in western India between the Vakatakas and the Chalukyas between the middle of the fifth to the middle of the sixth century AD.

48. EXCAVATION AT VETALWADI, DISTRICT AURANGABAD.—In continuation of the work of debris clearance at Vetalwadi, the Aurangabad Circle of the Survey resumed the work under the guidance of P.N. Kamble, assisted by J.M. Thapar, M. R. Dhekane, Ajit Kumar, S.L. Jadhav and G.L. Gaikwad. Vegetation and loose soils were entirely removed with a view to knowing the exact position of the Buddhist monastery, which belongs to the earliest phase of cave architecture in western India. It consists of a plain hall supported by four square-shaped pillars. Chinese glazed Ware, red and black wares, iron objects and arrowheads, stone lamps and animal teeth and bones as well as human bones were found.

49. EXPLORATION IN DISTRICT AURANGABAD.— P. N. Kamble of the Aurangabad Circle of the Survey noticed some rock-cut caves at Daulatabad. On the basis of a report from local persons, P. N. Kamble visited the Balaghat hill which is about 6 to 8 km away from the Daulatabad fort. On ascending the hill to a height of about 91 metres from the ground level facade of a rock-cut cave was noticed. The rock-cut cave measures about 914 metres in length and is between 1-2 to 1-52 metres in height. It appears that in the centre of the cave was a. shrine. A fine sculpture of Lakulisa was noticed in the right comer of the cave. There are figures of two male atendants to the left and the right of Lakulisa which is shown having with four-arms. To the right of the Lakulisa, a *chaturbhuja dvarapala* is shown in a standing position, holding a weapon in one of his raised arms.

From the vertical line marks on the rock as well as horizontal chisel marks, it appears that portions of the cave night have been divided by die artist; it seems that at a time at least four to five artists were working in the cave. One of the pillars is unfinished.

Apart from the above, ten rock-cut caves were found in the course of exploration of the Balaghat hill. Some of the caves have sculptures, of *saptamatrikas.* The caves measure about 3 metres in length, 3 metres in width; their height could not be ascertained since the caves are filled up with debris. Besides these ten caves, another three to five caves were noticed which are buried under debris.

At the southern foot of the hill in the centre of the ravines, regular cuttings of the rock were noticed at about six or seven places. At some places, adjacent to the cuttings rock-cut walls were also noticed. The purpose of these is not clear.

50. EXPLORATION AND SCIENTIFIC CLEARANCE, ELLORA CAVES, DISTRICT AURANGABAD.— P.N. Kamble of the Aurangabad Circle of the Survey carried out exploration at Ellora besides scientific clearance work which was carried out under the supervision of M.R. Dhekane. At Ellora there are three groups of caves; of these one is Jaina while the remaining ones are Brahmanical.

The caves are buried under debris and are located to the north of the Jaina caves; another group of caves, located close to a stream and to the north-east of the great Kailasa temple can be divided into two phases. Clearance of debris and vegetation was carried out from the Brahmanical caves located near the stream. These caves were found to be dedicated to Siva. In the Jogeshwari group, in the caves which were exposed, were noticed loose medieval sculptures of Brahmanical female deities as well as antiquities like pottery, bangle pieces, metal snake, iron objects, copper fishhooks, sickles, bones of animals and birds, etc. Among the loose sculptures, the most important are of Kali and Mahakali. Kali is seated on pedestal with hanging breasts without head; Kalaratri (Mahakali) is shown seated on corpse with hanging breasts in a terrific posture.

On the lintel of the shrine is the representation of Lakulisa, which is four-armed, seated in *padmasana* accompanied by two attendants and semi-divine beings. He is shown with *urdhva-linga* and is holding club, *akshamala,* skull-cup and coconut in his right and left hands. On both sides of the shrine are the figures of Saiva *dvarapalas* holding an axe, double trident and snake. To the right, is the figure of Parvati standing on lizard between two fires performing *tapas.* She holds the *linga* and Ganesa in her hands having nine small heads over her head which is a unique feature. The attributes, dress, ornaments, etc., of the Saiva *dvarapalas* show strong Pallava and Chalukya influence and could perhaps be dated to *circa* sixth-seventh century AD. Several Mahesamurti figures were also noticed in the Ellora caves.

51. EXPLORATION IN DISTRICT BEED.—In the course of village-to-village survey in Georai Taluka, S.L. Jadhav of the Aurangabad Circle of the Survey noticed the following antiquarian remains :

Taluk	*Village/Site*	*Nature of remains*
Georai	Borgaon	Medieval step-well
—do—	Jalgaon	Medieval pottery
—do—	Khandvi	Hero-stones, brass figures in the temple of Khandoba and Mahishasurmardini and medieval pottery, microliths
—do—	Nimgaonwadi	Disturbed mound yielding medieval pottery
—do—	Nipani Jawalka	Late medieval pottery
—do—	Pachegaon	Small tomb, stone *ghani,* sari-stone, etc.
—do—	Rui	Two medieval red ware sherds and late medieval Rama temple

Taluk	*VillagelSite*	*Nature of remains*
Georai	Ranjani	Step-well
- do -	Sindewadi	*Sati* stone, etc.
- d o -	Siras devi	*Sati* stone, etc.

52. EXPLORATION IN DISTRICT BHANDARA.—Chandrashekhar Gupta of the Department of Ancient Indian History, Culture and Archaeology, Nagpur University, explored Arjuni and Pauni Tehsils in the district. At Arjuni on way to the Mahadeva temple on the hillock which also has a medieval fort, a crude neolithic celt was found. Similar neoliths have also been reported earlier from Pauni. At Pauni, a good number of four-legged querns, bead polishers, beads of semiprecious stones and terracotta and structural remains were noticed. The legged-querns, which numbered several hundred, are generally broken into two halves. Some show decorated devices as well. Most of the querns are rectangular in shape, but some are of square and apsidal shapes. They are made of different types of stone, viz., sandstone, quartzite, trap, etc. The bead-polishers and unfinished beads from Pauni prove the existence of a factory site. Bead-polishers are made of quartzite and quartz. Some beads show employment of lathe as well. Some brick and stone masonry was noticed on the western and northern sides of Hardolala Tekadi. A well of well-baked bricks, about a metre in diameter, showing ten courses of bricks, was found in a pit to the north of the mound, dug by the villagers for *murum* (laterite soil). Agricultural activity noticed around this as well as Jagannatha Tekadi may have resulted in spoiling the site.

53. EXPLORATION IN DISTRICTS BHANDARA AND NAGPUR.— S.K. Lekhwani, N.G. Nikosey, J.S. Dubey and N.K. Nimje of the Prehistory Branch of the Survey under the direction of S.B. Ota carried out a reconnaissance survey in taluk Pauni and Bhiwapur in districts Bhandara and Nagpur respectively. This work was undertaken as a part of salvage exploration in the area to be submerged under Gosikhurd Dam Project on the river Wainganga. The following archaeological evidences brought to light:

District	*Tehsil*	*Village*	*Nature of remains*
Bhandara	Pauni	Gaidongri	Solitary handaxe and late medieval sculptures
—do—	—do—	Gosikhurd	Microliths
—do—	—do—	Jogikhera	Iron slag and late medieval sculptures
—do—	—do—	Kawadsi	Historical mound with iron slag
—do—	—do—	Khapri	Historical site
—do—	—do—	Kosra	Maratha period temple
—do—	—do—	Mendha	Historical mound
—do—	—do—	Naigaon	Late medieval sculptures

District	*Tehsil*	*Village/Site*	*Nature of remains*
Bhandara	Pauni	Nimgaon	Late medieval sculptures
—do—	—do—	Pahungaon	Late medieval sculptures
—do—	—do—	Pathri	Medieval sculptures
—do—	—do—	Pendhri	Early historical mound
Nagpur	Bhiwapur	Jambuida	Microliths, iron slag with potsherds
—do—	—do—	Neri	Late medieval sculptures
—do—	—do—	Parsori	Historical mound
—do—	—do—	Salebhatti	Early historical mound
—do—	Kuhi	Ambhora Khurd	Early historical mound

54. EXPLORATION IN DISTRICT CHANDRAPUR.— Amarendra Nath of the Excavation Branch (I) A.K. Sharma and S.B. Ota of the Prehistory Branch of the Survey explored in taluk Bhadravati an early historical site at Nandori (79°02'E, 20°ll N) situated on the right bank of Shimai nala, a tributary of Wardha river. The mound lies off the state Highway No. 84 between Bhadravati and Warora; it is quite an extensive one, and rises over eight metres from the surrounding plains. The site has brought to light stray microlithic tools, early historical and early medieval remains. The microlithic artefacts picked up from the site consist off take and core tools on materials like chert, chalcedony and agate. The pottery picked up from the site were mainly red and grey wares of both slipped and unslipped varieties. The red ware of medium to coarse fabric showed shapes like vases, basin, bowl, etc., which were akin to those found from other early historical sites located in Wardha-Wainganga divide. The antiquities of the early historical period included a barrel-shaped ear-stud of stone, sandstone fragment of a muller of dumb-bell type, a hopscotch dressed out of stone, and a glass bangle of black colour. Inside the village several architectural fragments of temple remains in Hemadapanti style, dated to tenth-eleventh century, were noticed. Between the Gram-Sevaka office and the entrance to a Maruti temple were noticed some thirteen loose sculptures of Brahmanical origin, they are, left to right; (1) Umamahesvara (45 x 35 cm); (2) four-handed Vishnu standing (40 x 35 cm); (3) Ganesa seated in *lalitasana,* trunk and hands mutilated (48 x 35 cm); (4) four-handed Ganesa, seated in *lalitasana,* trunk turned to left (80 x 48 cm); (5) *sati* stone in low relief showing right arm raised up in L-shape and symbols like the sun and the" moon in the upper panel (110 x 35 cm); (6) four-handed image of Varahavatara Vishnu (70 x 80 cm); (7) four-armed, standing Vishnu (85 x 50 cm); (8) four-armed, standing Chamunda with ferocious look, scorpion seen carved in the sunken abdomen (50 x 45 cm); (9) two *nayikas* standing (48 x 35 cm); (10) Brahma seated cross-legged (45x 30 cm); (11) Uma-mahesvara (50x 35 cm); (12) Uma-mahesvara, Uma's head mutilated (45x25 cm) and (13) unidentifiable lower portion of a dancing figure (30x40 cm). All these sculptures may tentatively be dated to *circa* tenth-eleventh century AD.

55. EXPLORATION IN DISTRICT DHULE.—S. N. Raghunath and K. P. Rao of the Excavations Branch of the Survey, as a part of the problem-oriented exploration in the upper Tapti Valley for the possible diffusion of Late Harappan Culture, if any, discovered the following sites in Nandurbar Taluk.

Taluk	*Village*	*Location*	*Nature of Remains*
Nandurbar	Arle	Backlash of eroded and monsoonal cultivated site deposit in the Tapti	Weathered Chalcolithic painted and unpainted black on red ware, etc.
-do-	Halt-Moida	Tapti Basin I & II terraces	Acheulian bifaces and cleavers on trap dolerite
-do-	Hat-Moida	Juni Basti 5 kms upstream	Deserted early historic rampart—with remnants of stone temple; Chalcolithic black on red painted pottery, chalcedony fluted cores and flakes
		Tapti/III Gravel	Rolled point, scraper with chalcedony and jasper, flakes and pebbles
Nandurbar	Korle	Ancient flood plain and recent monsoonal alluvial deposit of Patalganga	Weathered Chalcolithic painted and unpainted black on red ware, etc.
-do-	Shelte	II flood plain disturbed by modem agriculture and lift irrigation	Scarce fragments of Malwa/black on red painted pottery with other associated pottery
-do-	Sujalpur	Flood plain of (Maulad) 5 km from Sujalpur on the western flank	Redeposited secondary gravel fields, stray rolled cores and flakes of siliceous material; Black on red painte pottery with usual Malwa-Saurashtrian affiliation

56. EXPLORATIONS IN DISTRICT GADCHIROLI.— In the course of explorations in the southern tip of Sironcha taluk, Amarendra Nath of the Excavations Branch (I) of the Survey assisted by S. Pratapchandran and D. K. Kasbi, explored four villages of archaeological interest. At Sironcha (79°58/E, 18°51/ N) near the ferry point towards the left bank of Pranhita, good number of microlithic tools, basically on agate and chalcedony, were found. Besides worked flakes and cores, the assemblage included long blades with parallel sides, with and without retouch, backed blades,

lunates, crescents, etc. A few Middle Palaeolithic tools in the form of scraper were also picked up. Almost similar assemblages were noticed at two more villages, one at Somnur (80°16/E, 18°44/N) situated on the north side of the confluence of the Godavari and Indravati, and this other at Asarali (80°12 IE, 18°44/N) situated up in the valley slope on the left bank of the Godavari. At Somnur the microlithic tools were on chert and jasper also. The frequency of tools showed more of cores both of fluted and amorphous varieties than parallel-sided blades. At Asarali, majority of tools were on agate with some exceptions on chalcedony and milky quartz. It consisted of parallel-sided blades and scrapers.

The fourth site Nagaram (79°56fE, 18°50/N) is situated on the north side of the confluence of the Pranhita and the Godavari. Besides microlithic cores and flakes on chert and chalcedony the site has reportedred wares of early historical period. Among the shapes met with are jars, bowls, lid-cum-bowls, spouts of vases, basins, etc. Some sherds have decorations of roundels, slashed oblique lines and criss-cross patterns, the techniques adopted for were incision or applique. Among the antiquities mention may be made of shell bangle fragments, beads and hopscotches.

57. EXCAVATIONS AT ADAM, TALUK KUHI, DISTRICT NAGPUR.— In continuation of first season's work *(1988-89,* pp. 50-62), the Excavations Branch I of the Survey, Nagpur, resumed excavation at Adam (21°00/N, *19°2IIE)* under the direction of Amarendra Nath assisted by S.N. Raghunath and S. Pratapchandran, N.C. Prakash, N.K.S. Sharma, R.K. Roy, S.V. Sutaone, P.M. Bhope, H.J. Barapatre,D.K. Kasbi, D.S. Shambharkar, A.U. Ganarand Sultansingh with a view to.(i)reascertaining the chronology noticed during the first season's work, (ii) re-examining the phases of fortification and its relationship with the habitation inside, and (iii) the nature and formation of the moat around the rampart.

Out of the seven cuttings of the season, two were laid across the moat, one each on the north and the south, four inside the rampart at the centre, north, north-east (pl. XVI A) and south-east and one across the rampart on the east. The cuttings in which the natural soil could be reached reconfirmed the five-fold chronology noted earlier.

Period I: The first settlers at the site were the microlithic tools using people, who camped over the lateritic rock base having medium to thin soil coverage. The deposit, free from pottery, was found distributed extensively below the defence strata and also in the trenches at the south-east, centre, north and north-east, covering an area of approximately 150 x 150 m square. The deposit of reddish brown compact earth was fifty to sixty centimetres in thickness. The finds included a good number of cores and waste flakes besides finished tools like parallel-sided blades with and without retouch, and a few backed blades, lunates, points, burins, scrapers, etc., on chert, chalcedony, agate and quartz. In one of the trenches (18) traces of post-holes were noticed forming a semi-circle; it suggests the practice, during the period, of raising circular or oval huts of perishable material.

Period II: The deposit, of sixty to seventy centimetres of the pre-defence strata uniformly occurring in the cuttings wherever the natural soil was reached, showed a marked change in colour,

composition and compactness. It is a type of clayey earth, varying in colour from dark brown to pale brown with an admixture of grit and charcoal bits. The change in colour and composition is due to growth in the subsistence activities at the hands of the 'first farmers' of Vidarbha at the site. The continuance of microlithic traits of the preceding period, the introduction of copper technology, ceramic industry and manufacture of bone implements stratigraphically gives a horizon of Vidarbha Chalcolithic in the Wardha-Wainganga Divide. The ceramic industry comprised of red, black and black and red wares; white and black pigments were used externally for painting limited design elements like hatched diamonds, combed patterns and parallel horizontal lines over these wares. The fabric in general was coarse to medium, turned on medium fast wheel. The shapes prepared were vases, bowls, etc.

Corroded copper bits, terracotta annular beads, crucibles and bone implements occurred in this deposit Among them a bone disc with incised criss-cross oblique lines on one side deserves mention.

The C14 assaying carried out on a charcoal sample (PRI No. 1368), gave a date for the period

The C14 assaying carried out on a charcoal sample (PRI No.. 1368), gave a date for the period to 3230 +325 BP

\- 310

Period HI: It witnessed the emergence of iron technology at the site; however, other cultural equipments of the preceding period continued without any break. The ceramic industry while retaining the older painted design-elements, experimented with new ones in thick brush over a thick and coarse micaceous red ware, which included vertical parallel dashes, parallel horizontal lines, flame designs, etc. Another important feature noted was the painting in black on the interior of red ware dishes and bowls of medium fabric. The frequency of medium to coarse red ware predominated over the Black-arid-red ware while the latter outnumbered the black slipped ware.

Structural remains in the form of mud floors and post-holes were noticed but no complete plan could be obtained due to space constraint. The number of antiquities recorded include arrowheads, chisels, knives, ploughshares, rods and points on iron, finger rings and antimony rods on copper, points and engravers on bone and antler, bangle fragments on shell, beads of terracotta and semi-precious stones like agate. A few camelian etched beads with parallel lines on either ends, and zigzag lines covering surfaces in barrel-shape deserve special mention.

Period IV: This period is marked by a deposit of brownish clayey earth in composition. The black-slipped ware of the earlier periods was almost completely abandoned, while the Black-and-red ware continued with a flat or slightly convex base and a straight to 'S' profiled sides. The thick, coarse micaceous red ware of the previous period continued but the paintings committed to band motif of varying thickness in concentric order were limited to shoulder portion. Conspicuously, NBP sherd was obtained from this horizon.

Structures of the period were deviced either of burnt brick or stone with *murrum* lining at the base. Of the two structural phases, phase I is represented by a two coursed shale stone wall in mud mortar; the base of it had *murrum* lining. The exposed portion of the single coursed wall was semi-circular on plan while its thickness was 25 cm. The inner portion had mud floor. Of the phase 2 a

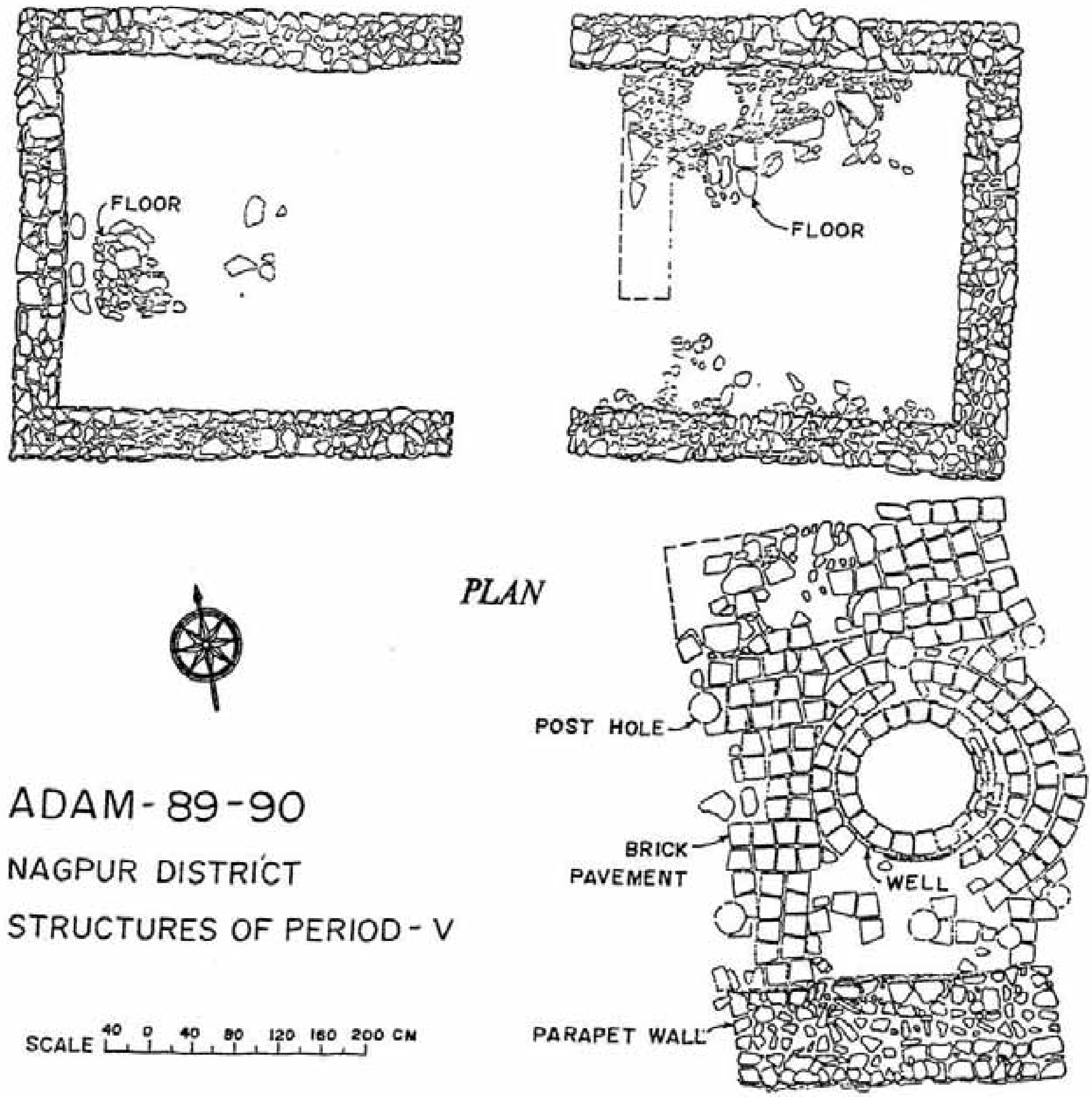

FLOOR
FLOOR
PLAN
POST HOLE
BRICK PAVEMENT
WELL
PARAPET WALL
ADAM-89-90
NAGPUR DISTRICT
STRUCTURES OF PERIOD-V
SCALE 40 0 40 80 120 160 200 CM

FIG. 5

well of burnt brick (dia. 110 m) having fifty-four courses was noticed cut into the natural soil (pl. XVII A). Another brick wall of eighteen courses was exposed which was aligned to a lane. The either ends of the wall seem to have been robbed; however, the wall appears to have been used as retaining wall in the succeeding period in which an outlet for a private drain was envisaged (pl.. XVIB).

Antiquities of the period include iron spear and arrowheads, chisel, sickle, ploughshare, knife etc., a decorated copper hair-pin; bone scrapers, points and a dice; ivory stylus terracotta ear studs, gamesman, wheels and balls; sling balls, studs and weights of stone; beads of different shapes of semi-precious stones, shell and terracotta.

Period V: On the basis of numismatic evidence, the period has broadly been sub-divided into two phases, namely the Satavahanas and Maharathis, however, no change is noticed in the material cultures of these two historical phases. Pottery of this period was predominantly red while the black, kaolin and red polished wares remained subordinate in demand. A variety of shapes like *handi,* jars, dishes, bowls, lids and lid-cum-bowls and sprinklers were noticed. Decoration was done by different techniques like incision, applique, stamping, pinching, cording, etc., while painted decoration was altogether dispensed with. Among the decorative motifs birds, rosettes, *triratna, svastika,* etc., are worth mentioning. Small and meidum sized limestone ware, having very smooth lathe-turned finish, provided shapes of casket, bowls and lids, etc. Some of the caskets and lids are having incised decoration. One medium size red ware container with convex base and straight profile with *jali* sides deviced by arranging series of *svastika* motif one above the other was another notable ceramic type.

Structures (fig. 5) reported from this period were rectangular, square, elliptical and, circular on plan. The complex of a rectangular stone (9x3-5 m) structure and circular brick well sealed by layer (1) could be exposed completely. The well (dia. 1.10 m) of seventy-six courses cut into the natural soil was built out of wedge-shaped bricks in mud mortar. On the north and south sides of the well, traces of post-holes and low parapet wall were noticed which supported a low roofed structure over the well, and was open from east and west sides for the purpose of drawing water. The covered space along the well was paved with same types of bricks (pl. XVIIB). The elliptical structure, on plan, consisted of central chamber and antechambers on either ends of the apse formed another type of structure at the site. Several circular platform-like stone structures within an enclosure were also noticed. The exact nature of these structures remains to be determined. A good number of terracotta ring-wells with a maximum of twenty-three (pl. XVIII A) and a minimum of seven rings were exposed at the site. Interestingly, the latter had a chamfered globular ring base over which six rings of uniform size were set. In one of the ring wells double rings were used to form a course. It had' broken insertion of ring over the ring, unmindful of structural uniformity.

Out of the three primary burials, two were extended and the third was in cross-legged seated posture (pl. XVIII B) of a grown up person. Of the two extended burials one was Of a child lying on its left side while the other was of an adult disposed in prone position, with portions below the knee mutilated.

Number of antiquities were reported from this period which include sealings, coins, figurines, beads, pendants and other miscellaneous household items on clay, metal, ivory, bones, glass and semi-precious stones. The terracotta sealings of *Sevaka Putra* (pl. XIX A), *Salankayana* (pl. XIX E) *and Mahasenapati* (pl. XIX B) are of historical interest, while the occurrence of coins of Bhadras, Satavahanas (pl. XIX C) and the Maharathis (pl. XIX D) in the stratigraphical context establish the chronology of these rulers in this region.

The site' had a bead industry evidenced by beads in various stages of manufacture. They were of. various shapes, manufactured on glass, terracotta, semi-precious stones, steatite, kaolin, shell, bone and copper. Mention may be made of few etched camelian beads with line designs and a crystal bead with an excellent finish, and studs of black jasper, having radiating grooves. Mention may be made of a few bead polishers found in the course of excavation.

Number of terracotta figurines excavated included profusely ornamented dwarfish mother goddess, *mithunas, yakshas,* and fragmentary male and female heads with elaborate head-gear. Animal figurines included caparisoned horses, elephants, bulls, dogs and. birds. Some of the animal figurines had a hole across the legs to be used as wheeled toys. Majority of the figurines were prepared in double mould. A few kaolin terracottas were also recorded from this period. Terracotta antiquities like wheels, spindles, skin rubbers, bangles, weights, ear studs, gamesmen, votive tank, etc., were also found.

The discovery of a broken but rare bone comb with carved handle depicting on one side two pairs of seated *mithuna* couples (pl. XX A) and on the other a row of elephants coming out of pond (pl. XX B) is one of the outstanding finds at the site.

The cutting across the rampart further confirmed, besides the different phases of construction, the nature and formation of the rampart. However, the moat cuttings provided new evidences showing the outer escarpment of the moat with steep cutting into the bedrock, while southern moat with steep cutting into the bedrock, while southern moat provided a series of parallel channels of differing dimensions running east-west. Whether these channels formed part of some filtering system or some other hydraulic need of the time is yet to be ascertained.

58. EXCAVATIONS AT RAIPUR, DISTRICT NAGFUR.— The megalithic site of Raipur, about 20 km west of Nagpur was excavated after a break of three years, over three seasons between 1988-90 by G. B. Deglurkar of the Department of Archaeology, Deccan College, Pune. He was assisted by Gouri Lad and P.S. Joshi. In all, four megalithic circles were excavated. The Raipur stone circles, conforming to the general pattern in Vidarbha, however, display certain special typological features, which though partially traceable on the surface, are better detailed in the excavations.

Circle No. 1 and 2, more or less of the same dimensions with a diameter of about ten metres, differed in the quantum of filling. No. 1 with a minimal filling did not yield any skeletal remains, a very small quantity of pottery and only two fragmentary iron objects were recovered from it. No. 2, with greater amount of packing yielded a much greater quantity of pottery and more numerous iron objects— adzes, nail-parers, a ladle and a knife, besides two copper bells. The excavation was thus able to establish a connection between the quantum of filling and the quantum and variety of cultural assemblage.' Greater care about filling and packing seems to have been taken with regard to circles containing larger number of funerary goods.

Circle No. 3 with a diameter of about 18 metres was one of the largest circles in the complex. The peripheral boulders of this circle too were unusually large. Right in the centre of the circle were visible a group of four boulder heads jutting out prominently despite the heavy filling. Excavations revealed a central chamber of nine huge boulders placed adjacent to each other, to form an irregular circle. The chamber measuring 1 -60 to 2-30 metres in diameter, and two metres deep, was filled with loose brown soil. No skeletal remains or antiquities, except a broken muller stone was recovered from within the chamber. A more interesting feature typologically was the stone alignment with many courses of horizontally laid stones, encircling the chamber, to its full height,, from the outside. Specially large stones with flat surfaces were chosen for the alignment to give the impression of a compact walled-in chamber, besides lending support to the erect chamber boulders. The antiquities came from outside the chamber, mostly laid on the *murrum* below the black clay patch in the north-west and south-west quadrants. They include bangles, rings, a pot with a decorated lid and a bell all of copper, two assemblages of iron tools and weapons, chisels, daggers, arrowheads and sprearheads besides a number of smaller iron objects. The circle was particularly rich in pottery which included micaceous red, Black-and-red and coarse red wares in ample quantities. Human skeletal remains, probably of two individuals, were- also recovered from the black clay patch. They are however mostly in a fragmented and crushed stale.

Circle No. 4, immediately adjacent to No. 3, was one of the smallest circles in the complex, with a diameter of about 8 metres and a very thin layer of filling. The circle erected on a slope running north-south revealed, after excavation, a peculiar arrangement of the boulders on the northern periphery, with two layers of rather biggish stones laid one over the other, to prevent the dislocation of the periphery and consequent water-logging and erosion of the soil. A number of small iron objects and micaceous red, Black-and-red and coarse red ware pottery were recovered from the circle.

59. EXCAVATION AT THARSA. DISTRICT NAGPUR.— The Department of Ancient Indian History, Culture and Archaeology, Nagpur University, Nagpur, conducted archaeological excavation in continuation of earlier work (*l 985-86,* pp. 58-60) at Tharsa (Lat 2 3 ° 13’ N; Long 79°23 E) in Tehsil Mauda, Nagpur, under the direction of Ajay Mitra Shastri assisted by Chandrashekhar Gupta and Ismail Kellellu. Four trenches were laid out at different localities of the habitational mound and on the western slope to get the nature of habitational pattern. One trench (XA^1) was laid in the fields lying south-west of the mound near the first seasons' trenches. Second trench (YA^1) was taken at

the foot of the mound on the western side. The trench (ZA^1) on the north of the mound on the flat surface on the slope of the mound while the main trench (A^1) was taken on the highest point of the mound near the present Zilla Parishad High School. Due to modem constructions and the agricultural activities the scope of the excavations was restricted.

The trench XA^1 gave evidence of protohistoric period which was also found represented in the main trench A^1. In Trench A^1 thirteen habitational layers were exposed which may be divided into five periods on the basis of cultural material yielded in them. They are as follows:

Period I	:	Protohistoric	Chalcolithic/Megalithic (layers 6 to 13)
Period II	:	Early Historical	Pre-Satavahana, Satavahana (Layers 4 and 5)
Period III	:	Late Historical	Vakataka (layer 3)
Period IV	:	Medieval	(layer 2)
Period V	:	Modem	British (layer 1)

Period I yielded pottery comprising of black ware, Black-and-red ware, red ware, tan ware, micaceous red ware and black painted on red ware. Some potsherds show slip while some show burnishing. The pottery types include bowls, dishes, troughs, globular pots and *lotas.* The painting is done in black on bright red surface. In a few cases it has turned violet. One solitary piece of Black-and-red ware out of which a hopscotch was prepared shows hatched diamond design painted in white. The designs are vertical and oblique strokes, diamonds with various types of hatchings, horizontal straight and wavy bands, etc. Some potsherds show graffitti marks. Bone objects, hopscotches in stone and terracotta, spindle whorls, copper rings and bangles, terracotta beads and stone artefacts, viz., a flat polished celt, ringstone, rubberstone, pounder etc., was found from this Period. The neolithic celt is interesting as it is almost rectangular (very slight tapering towards butt) on plan. The evidence goes well with the finds of the last season.

Period II was represented by a rich habitational deposit yielding red ware, grey ware and micaceous black as well as red ware. Besides bowls, dishes and globular vessels, some lid and spouted pots were also noticed. Some beads of semiprecious stones, terracotta, shell, etc., and pendants in terracotta and ivory, ear ornaments, shell and glass bangles, terracotta toy cart wheels, hopscotches in terracotta and stone, copper bangles and miscellaneous objects; iron nails, chisels, etc. and terracotta figurines of animal and human forms were the noteworthy finds of Period II. One terracotta fragment illustrating head with sharp facial features and a turban-like headgear shows double-mould technique. A square copper coin was also reported, but due to heavy coating of exides it is not possible to identify it. It may be noted here that a good number of coins have recently been reported from Vidarbha region bringing to light some new dyansties of local rulers belonging to pre-Satavahana period. These dynasties are Mitras and Bhadras. The fabric of this coin very much resembled the coins of these rulers.

Period III was represented by typical pottery such as red ware, black ware, Black-and-red ware, Red Polished ware, etc. Some beads of semi-precious material and terracotta, shell and glass bangles, terracotta animal figurines, tiles, iron nails and other objects were encountered. The animal figurines are worth noticing as they represent both solid and hollow body types and applique decorations.

Period IV was medieval and yielded mostly red and grey wares and a few copper coins issued by the Muslim rulers.

Period V showed foundation pits and a burnt brick masonry of British period when a Police Chowki was constructed on the top of the mound and at places the slope was trimmed or raised in order to meet the need. Some iron clamps and clasps and a Victoria copper coin were found from this Period.

Periods II and III were found very much disturbed by pits dug in Period III. Middle Palaeolithic tools and microliths were found in the debris of the Historical Period and from the river bed which may suggest the possibility of existence of stone age cultures in the vicinity of Tharsa,

60. EXPLORATION IN DISTRICT NAGPUR.— In the course of explorations in the Nagpur, Saoner, Ramtek and Kuhi Tehsils, Chandrashekhar Gupta of the Department of Ancient Indian History, Culture and Archaeology, Nagpur University, discovered several sites belonging to different periods.

One handaxe and several Middle Palaeolithic tools were found in the sand brought to Nagpur for construction purpose from the Kanhan river-bed. A neolith and some sherds of Black-and-red ware were found at village Sillewada situated about 16 km north of Nagpur. The tool is a small chisel made by grinding technique. Both Sillewada and Kamptee (from where sand yielding tools are found) are situated on the banks of the river Kanhan. On the hill of Ramtek and Mansar fortification walls of the Vakataka period were noticed. These are built in dry stone masonry. In one of the medieval temples on the hill some early architectural members of the Vakataka period and an iron pillar were noticed. The pillar is about three metres high and provided with flutings placed obliquely and facets on the shaft. An abacus circular in section, and a serpent-hood-like capital surmouting it are seen at the top while the other end is buried in the floor of the small *sabha-mandapa* of the shrine.

A stone plaque depicting Balarama, a fragment of carved conch-shell and some early and late copper coins were also noticed at Ramtek. At Adam, in Kuhi Tehsil, a few early copper coins, beads of camelian and terracotta were collected on the slopes of western side of the mound.

61. EXPLORATION IN DISTRICT NAGPUR.— In the course of his explorations Ismail Kellellu of the Department of Ancient Indian History, Culture and Archaeology, Nagpur University, discovered one protohistoric and two early historic sites respectively at Shirkanda (locally known as Shrikanda), Morgaon and Wagholi in the Mauda Tehsil of the District.

The extensive protohistoric site lying between the left bank of the river Sur, a tributary of the river Wainganga, and the small village Shirkanda (lat 21°17' N; Long 79°31'E) (total population

about 125) is about 13 acres (5.2 hectares in extent with habitational deposit of about 4 metres at its highest The whole surface of the mound is littered with potsherds of micaceous red ware, red ware, black-slipped ware, Black-and-red ware and black painted red ware the types and painted designs of which may well be compared to the Chalcolithic/Megalithic pottery recovered from the recently excavated site at Tharsa in the same Tehsil. Besides this diagnostic pottery, Shirkanda also yielded fluted cores, iron slag and some charred animal bones. The importance of this site lies in the fact that after Adam it is the second most extensive and intact of all sites so far known in the Vidarbha region.

The other two early historical sites, one at Morgaon (Lat 21°16' N; Long 79°31'E) about one and a half kilometre to the south of the village on the left bank of seasonal *nala,* Baggar, a tributary of the river Sur, and the other site at Wagholi (Lat 21°15' N; long 79°29' E), about three kilometres north of the village Revrala, yielded pottery comparable in type, shape and fabric to those encountered from the Satavahana and Vakataka sites.

62. EXCAVATION AT IRLA, DISTRICT OSMANABAD.— Excavation at Irla was conducted by the Department of Archaeology and Museums, Maharashtra State, under the guidance of A.P. Jamkhedkar and Shri K.D. Kawadkar, Chetan S. Sali and R.R. Borkar.

Irla is a small village located on the right bank of river Tena and 23 kms south-east of Osmanabad. The site was discovered by M.G. Dikshit and is spread over 10 acres (4 hectares) area.

In all, three trenches were dug at different levels to find out the potentiality of the mound. Altogether, three floor levels were exposed at different depths. Two urn-burials, one sealed by the middle floor level and another by the earliest floor level were exposed. The earlier contained a broken tibia along with a piece of long bone and the later a cranium with a piece of long bone.

Pottery assemblage consists of Red polished ware, red ware and black ware, the last two include burnished as well as plain-variety. Associated antiquities included terracotta beads and those of silicious material; bangles of glass and shell; blade, knife and nails of iron and terracotta figure of monkey.

The remains could be assigned to the third century AD.

63. EXPLORATION IN DISTRICT OSMANABAD.-- M.R. Dhekane of the Aurangabad Circle of the Survey during the course of exploration of submergence area of the Lower Tena Project, Taluk Umerga, noticed a Hemadpanti temple at Nagpur. It is of the thirteenth century belonging to the period of the Yadavas of Devagiri. The temple faces the east. It is a fine specimen of temple architecture of the Deccan without *sikhara.* The temple is situated in the heart of the village on high platform of dressed stone, *lthas sabha-mandapa,* ante-chamber, proper shrine *and pradakshinapatha.* It is dedicated to Siva. It has a plain exterior except for the two hundred and thirty five *kirttimukhas* which are sculptured on the outer wall of the temple or on the *devakoshtha* of the temple. The *sabha mandapa* is supported by four elaborately carved pillars, which are square at the base and rounded on the top. Over the shaft of the pillars are the figures of *ganas* carrying the weight of the temple in

their four hands.

The door-jambs of the temple are also elaborately carved with male and female *dvarapalas* and *dvarapalikas* on the lintel of the temple is a four-armed seated Ganesa, flanked by two lions. The antechamber is also supported by two pillars and pilasters minutely and lavishly sculptured with four armed Vishnu figures. The miniature paintings are done on the wall of the antechamber as well as the *sabha-mandapa.* The scenes depicted are from the epics, the *Ramayana* and the *Mahabharata.* The temple has two windows. The paintings are done in red, white and black pigments. Outside, there is a rectangular shaped stone on which *pancha-saktis* are sculptured with Ganesa and Virabhadra as their guardians seated on their respective vehicles, *viz.,* Brahmi seated on *hamsa;* Vaishnavi seated on Garuda; Sarasvati-Mangala seated on ram probably; Mahesvari on bull; and Chamunda/Kali or Kalaratri seated on corpse. Village goddess is also represented in the village who is worshipped for the protection of the child. She is known as Satawaidevi in the village. She is represented in a semi-divine form.

64. EXPLORATIONS IN DISTRICT PUNE.— Consequent upon the discovery of the Acheulian site of Bori (Lat 19°07' 30" Long 74° 06' 30"), in Junnar Taluk, Pune district in 1986 by V.S. Kale of the Department of Geography of Poona University and dating of the volcanic ash deposit discovered near Bori by K-Ar method to 1.4 million years, the Kukdi river deposits around Bori were mapped in detail by the Deccan College, Pune. This mapping has shown that there are eight volcanic ash exposures between the villages of Vadgaon and Jadaovadi. At two locations, artefacts were found in contexts which are definitely below the ash. More importantly, the Acheulian gravel at location 4 interlayers with the magnetically reversed clay deposit in which the ash layer occurs. These findings suggest that hominids were present at Bori prior to the ash fall. At the time of the ash fall Early Acheulian technology was already developed. The first evidence for the presence of man prior to the ash fall comes from location one. At this location, well has been dug into the volcanic ash bed. The volcanic ash is the uppermost layer in the well. The well reaches the bedrock 8 metres below the volcanic ash and 5 metres below the river level. The volcanic ash is underlain by black fissured clay which has well developed slickenslides and nodular *kankars.* The lowermost layer in the well is a pediment gravel containing weathered trap pebbles. One dolerite flake was found in this gravel. The flake shows a well developed striking platform bulb of percussion. It matches the pebbles in the gravel in abrasion and patination.

In January 1989, a large basalt flake was found in situ 1.5 metre below the ash exposed on the right bank of the Kukdi at location 5. The dorsal surface shows some step flaking along the left margin due to previous flake removals.

The Acheulian assemblage is from gravel at location 4.152 artefacts were collected from this gravel. These include 3 choppers or cores, 3 polyhedrons, 6 bifaces, of which 4 are trihedral picks, a bifacial chopper and a crude ovate handaxe. 140 flakes were present of which 120 are of basalt or dolerite and 20 of multicoloured cherts. The flakes are mostly small with an average size of

5.2 x 4.1 x 1.5 cm. They have thick wide-angled platforms which are plain or dihedral. Flake scars are deep and prominent with a distinct lip on the platform edge. Regular retouch is absent.

The gravel in which these artefacts were found cuts into the volcanic ash layer which is exposed as a small patch surrounded on three sides by the gravel and the fourth by the Kukdi river. The gravel is overlain by black fissured clay which can be traced to a clay exposure in the adjacent *nala.* In this *nala* exposure the gravel is absent but at the gravelash level a thin band of volcanic ash is present. This, in effect establishes that the gravel and ash are both lenses within the clay. Thus, the lithostratigraphical correlation demonstrates that there is not significant time gap between the tool bearing Acheulian gravel and the underlying volcanic ash.

All this evidence has led to the important conclusion that the Lower Palaeolithic in India goes back well into the Lower Pleistocene.

The Middle Palaeolithic site of Ranjani on the Mina river (Lat 19°3' N, Long 74°4' E), Junnar taluk, Pune district, was discovered by Sheila Mishra an Savita Ghate of the Deccan College, Pune. The artefacts occur in a weathered gravel deposit. The gravel is part of the Pleistocene deposits exposed just downstream of a dyke crossing the Mina river. The gravel directly abuts the dyke which supplies the raw material for the tools. The collection consists of 9 cores and 15 flakes all made on dolerite dyke material. The low proportion of flakes and abrasion and weathering of the artefacts shows that we are not dealing with a primary artefact context. The most interesting feature of the collection is the variety of core types, documenting a more sophisticated flaking technology than that seen at Bori. Two prepared cores, two disc cores and a single platform cylindrical core are present. Four of the flakes show traces of deliberate retouch, partially obliterated by abrasion and weathering of the artefacts.

65. EXPLORATION IN DISTRICT WARDHA.— Amarendra Nath of the Excavation Branch (I) and A. K. Sharma and S.B. Ota of the Prehistory Branch of the Survey. Explored a major site yielding protohistoric and early historical remains at Arambha (20°34' N 78°59' E) in taluk Samudrapur. Situated in the flood plains of the Vena and the Pothara rivers, tributaries of the Wardha, the site lies to the immediate east of a highway between Jam (8 km north) and Hinganghat (12 km south). The site brought to light typical black-and-red ware bowl with graffiti marks which normally occur in megalithic .context. The micaceous red and chocolate-slipped red wares demonstrated shapes like vases having splayed-out featureless rim, and bowls having convex profile with featureless rim. Retouched flake tools in jasper and chert were also picked up. The pottery of early historical period was predominantly red ware, both slipped and unslipped. The shapes met with were vases, basins and bowls. The antiquities picked up from the site included a barrel-shaped camelian bead, terracotta toy wheel with projected hubs, red ware dressed spindle whorl, hopscotches both dressed on pottery and stone, shell bangle fragments, one having groove decoration, sandstone sling ball, sand stone muller fragment, circular spool-like terracotta spacer bead one end decorated with radiating rays.

Several structural remains in stone and burnt brick were noticed on the surface and in the

exposed sections of the mound. A burnt brick structure, seemingly circular on plan, imposingly stands in south-eastern part of the present day village. It is in highly denuded condition and is camouflaged by modem habitation. However, in the upper slope portion of an exposed elevation eight brick (23 x 18 x 5 cm) courses in mud mortar and at its base random-rubble in mud masonry could be noticed. It would be too early to call it a stupa. There are remains of several other structures below the present day village.

MANIPUR

66. EXPLORATION AT SEKTA, DISTRICT IMPHAL.— The State Archaeology, Government of Manipur, reported the discovery of a number of elaborately decorated human skulls along with necklaces made of precious stones, bronze vessels, bracelets, etc., from the Sekta village, located about 16 kms north-east of Imphal. The materials were recovered from the valley side slope of the hill locally known as Thumkhong Ching at a height of about 60 metres. Thumkhong Ching (Hill) forms part of the hill range, running in north-south direction, known as Pidonnu hill range. The hill slope from where, the archaeological materials were unearthed is covered thickly with red soil. However, continuous erosion of the surface by small shallow channels led to the exposure of the buried cultural materials. The gold masked human skull along with necklaces, bracelets and bronze vessles were found buried inside three big pots. The archaeological materials and the site have, however, been damaged extensively by villagers in their search for hidden treasure. The hill slope was excavated upto a depth of about 5 metres and large pits dug here and there by villagers were noticed throughout the entire hill slope. The material was later recovered from the villagers and is now in the custody of the Manipur State Museum.

67. EXPLORATION AT CHINGEI CHING, WAITHOU, DISTRICT THOUBAL.— The State Archaeology, Government of Manipur, carried out exploration at Waithou and discovered charred rice grains on the top of the small hillock known as Chingei Ching. The charred rice grains are found deposited upto a depth of 0-35 metre near the western part of the hillock.

MIZORAM

68. EXPLORATIONS IN MIZORAM.—The Archaeology unit attached to the Mizoram State Museum, Aizawl reported the presence of archaeological remains in the following different areas of the state.

At a distance of about half-a-kilometre from the Zote village in District Aizawl are located six caves in two rows, more or less similar in size and shape. These caves (Mura Puk) take their names from a legendary story supposed to be connected with this Mura. According to the legend, a gigantic

eagle known as 'Mura' used to live in this area long ago. It used to prey upon human beings inhabiting the area. The eagle followed a unique method of capturing its prey. It would sit quietly on the hutment spreading its wings to cover the whole roof. Its tail would then be pushed through the rear door to knock up the inmates and as anyone would, out of fear try to run out of the front door, it would catch him with its fierce beak. Mura was thus a source of constant fear to villagers and they were trying to device measures of safety from the attack of the Mura. Thus the inhabitants of the area dug these caves as a means of protection against Mura's onslaught.

It is believed that the Hmar, one sub-tribe of the Mizos who inhabited the north-eastern part of Mizoram, were living in the area during that time.

The other remains are that of a brick building at Zamuang in District Aizawl. Two important features of this structure is a drain covering a fairly large length, and a brick pillar about 5 feet (15 metres) high, one foot (03 m) in breadth without any plaster. Burnt bricks of four different sizes were used in the construction of walls which were lime plastered.

There are nine stones erected in memory of Mahgkhaia, a famous Ralte Chief at the southern extremity at Mangkhaia Lung of Champhai Valley.

According to local source, till recent past, quite a large number of stones (exact number not known) were erected in the memory of Mangkhaia at the southern tip of the Champhai Valley which occupied about two hundred square feet (1858 metres square) of land area. With the passage of time, Ruantlang village, previously a small village, was extended and the memorial stones were removed and on their place, houses were built. At present, nine memorial stones removed from the original places could be seen. On one memorial stone, twenty-five human figures with hands interlocked are engraved.

There are diverse views about the story of Mangkhaia Lung. According to Pu Saingena of Champhai these memorial stones were erected by the Raltes in the memory of their beloved chief Mangkhaia. Mangkhaia was the son of Mangthawnga, the chief of Tuichhin. When Mangkhaia attained maturity, he established a new village at Zotlang in which he ruled over his subjects with kindness and generosity. Zotlang is situated about two kilometres south of Champhai. As the story goes, Mangkhaia's village was invaded by the Sukte from the east Even though the heroes of Mangkhaia's village fought valiantly, the Sukte were victorious and Mangkhaia himself was taken as captive. Then the Sukte killed him at Rallang village which is situated somewhere in Burma. When his subjects came to know about the death of their chief, they erected his memorial stones which came to be known as Mangkhaia Lung, Others believe that the memorial stones of Mangkhaia were erected by the Hmars who inhabited the area until the first quarter of the present century.

It is, however, more likely that the memorial stones of Mangkhaia were erected by the Ralte as Mangkhaia belonged to Ralte sub-tribe of the Mizo.

At the old site of Zote village, about half a kilometre east of the present Zote village can be seen

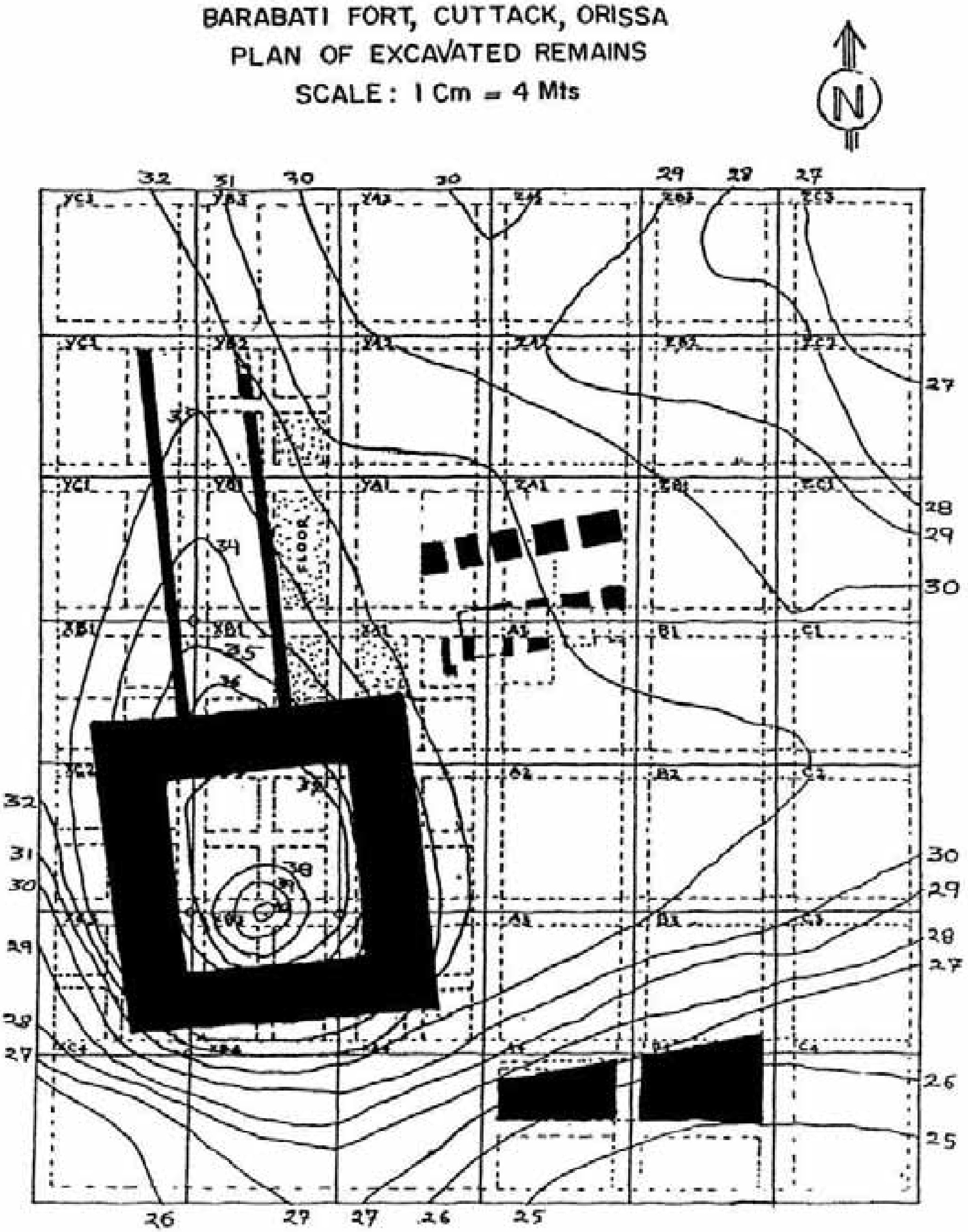

BARABATI FORT, CUTTACK, ORISSA
PLAN OF EXCAVATED REMAINS
SCALE: 1 Cm = 4 Mts
N
FLOOR

FIG. 6

the Sikpui Lung, a solid rock about nine feet long (2743 m) four feet and six inches (1 "371) in breadth and ten inches (0254 m) thick lying flat on the ground.

According to Pu Saingena of Champhai, the Hmar, in their usual practice, used to observe Sikpui when a village enjoyed good health and harvest at least for three consecutive years. On this rock the following lines were written :

"He lung hi hmanlai Hmar ho Sikpuina a ni. keini kum 28.2.1918-ah *hian kan awm tan ta.*

Zahulha Sailo.

Its translation into English is as follows:.

"This is the Sikpui stone of Hmar of the past and we occupied this place from 28.2.1918".

Zahulha Sailo"

The Lianhela Puk is situated about nine kilometres south-east of Ngopa village, two and half kilometres south of Lengteng peak, the highest peak in Sialkal range. As the cave is located on the face of a great precipice there is only one pass leading to it. It is ninety-nine fathoms long (181051m) and six feet (182 m) deep. The location of the cave is about 6,000 ft (1828 m) above sea level, and the climate is very cold even in summer.

ORISSA

69. EXCAVATIONS AT BARABATI FORT, CUTTACK, DISTRICT CUTTACK.—The Excavation Branch IV of the Survey under the direction of B.K. Sinha, assisted by K.M. Suresh, P.N. Biswas, P. Biswas, M.P. Singh, B. Pattnaik, N.K. Behera, B.K. Das, S.K. Bhoi and R.N. Sahoo, undertook excavations at the high mound situated inside the Barabati Fort, Cuttack (Lat 20° 29; Long 85° 52') in district Cuttack. The aim of the excavations were: (1) to establish a cultural sequence at the site in view of the existing tradition that the city of Cuttack was founded in AD 989; and (2) to conduct area excavation at the mound in order to expose the remains of various cultural periods.

The mound at Barabati Fort covering an area of approximately 6,500 sq metres, at its highest point, has a height of 15.6 metres. The top of the mound was occupied by a bench mark, having a height of 40.6 metres above MSL. Around the highest point, in a small area, were steep slopes descending to a depth of 9 metres, at which height the mound had a flatter appearance.

Trenches (fig. 6) taken at the highest point adjacent to the bench mark showed that there was loose filling, supplemented by stones upto a depth of 5 metres, below which there was a structure of dressed khondalite stone, profusely pointed in lime mortar.

It was seen from the records available in the office of the Director, Geological Survey of India, Bhubaneswar, that this filling was done by the Survey of India in the year 1854-55 for establishing

a triangulation station at a height of 40.6 metres above M S L which also served as a bench mark and Pendulum Station.

The stone structure, below the triangulation station, was cleared on all sides. The excavations revealed that the structure was a square one, built up of dressed khondalite stones and was available to an average height of over 3 metres with each side measuring 20 metres. On the eastern side, the structure was available upto a height of 5 metres. The structure, at a height of 1.95 metres from the base, had a terrace all around and the recession marking the terrace measured 1.85 metres, the terrace being more prominent on the southern and eastern sides. The comers of the square structure, showed tapering inwards and lime pointing was profusely done. The total thickness of the structure was 4.10 metres on each side and the central area of the square structure had a filling of greenish compact earth embedded with potsherds. The structure was approached by a gentle ramp from the northern side which had walls of dressed stone. The space, in between, was filled with earth akin to that in the core Of the structure. The stone ramp was interlocked with the main structure and was available to a length of 25 metres, running towards north. The dressed stone walls of the ramp had a thickness of 1 metre and the area between the two walls consisting the filling had a width of 7.6 metres. Like the structure, the ramp was also pointed in lime mortar all around:

Associated in the north-eastern corner with the structure and the ramp was found a lime flooring having a width of about 5 metres and was available to a distance of 20 metres, along the eastern side of the ramp (pl. XXI A).

In the construction of the structure and the ramp architectural fragments and sculptural panels, possibly extracted from some destroyed temple in the area, were used along with dressed khondalite stone blocks. In the filling cleared from over the structure, two mutilated heads of female deities and other small and big architectural fragments numbering over hundred, were found. A small earthen lamp found in the debris over the terrace of the structure, on the eastern side, indicated the possibility of lamps being lit on the structure which possibly hinted the structure, being a 'Samadhi'.

Excavations at the foundations of the structure all around, revealed that the structure was built over an area which was carefully prepared by filling upto about 5 metres the earlier remains at the site with sand and *malba* and thus preparing a fairly big flat area. Dressed stone paving and traces of lime flooring were found on other sides of the structure also.

Trenches taken on the eastern side of the structure and beyond the lime flooring, revealed a filling of sand and debris. Cutting through this filling, upto a depth of 5 metres, revealed the existence often pillars, roughly square on plan measuring 2.35 metres, 1.90 metres, 1.70 metres, 1.90 metres and, the last one partially excavated, 1 .45 metres, made of laterite blocks. The gap between the pillars, being 1 metre, 1.20 metres, 1.35 metres and 1.65 metres, the pillars were in two rows of five each and the distance between the rows, was 4 metres. The pillars, specially the two in the south-eastern corner, had been subjected to thorough stone robbing and the robber trenches were seen running down from the top (pl. XXIB). The space between the pillars and the rows of pillars, showed a dump alternately

comprising of sand and *murrum* layers interlocking with each other. One of the pillars was found going down to a depth of 5 metres and showed 21 courses of laterite blocks, the 21 st course not being the last. One significant thing was that no occupational strata has so far b8en seen and the working level of these pillars has not yet been reached.

At the foot of the mound, on the eastern side, two trenches 10 metres long, were taken and these revealed the existence of what appears to be a citadel wall. This wall is built up of laterite blocks and has been thoroughly robbed; the wall is available to a length, east-west, of 20 metres and shows a width of about 5 metres. The outer face of the wall, has not yet been exposed but the wall is available to a depth of about 1 metre below the public road, running 20 metres south.

Besides the sculptures and architectural fragments recovered during the excavations, other antiquities found were, pieces of Chinese porcelain, iron nails, empty brass cartridges, lead bullets, a stone cannon ball, stem and base of a glass goblet and some earthen lamps.

70. EXCAVATION AT LALITAGIRI, DISTRICT CUTTACK.— In continuation of previous work, *(1988-89,* pp.65-66) excavation was resumed by the Bhubaneswar Circle of the Survey at Lalitagiri by G.N. Srivastava, assisted by S.K.Dey, D.K. Lokhande and Amal Roy under the direction of G.C. Chauley. During this season, digging was concentrated mainly in the monastic establishment of LTG - 2 mound. However, an extension of 1 5 metre on the back side of the *Chaityagriha* was dug to expose the brick retaining wall, a portion of which was already visible. Another mound, named as LTG-4, on the extreme north-western comer of the hill was taken up for excavation and 12 trenches of 6 x 6 metres were dug. Besides, two trial trenches of 5 x 2 metres on the back side (westwards) of the *matha,* falling in LTG-2 mound were excavated.

As reported earlier *(1988-89,* p. 65) the monastery is quadrangular on plan measuring 36 x 36 metres. It comprises a central courtyard, bordered on all sides by a pillared verandah (all pillars except one are missing) around which are arrayed an entrance porch, seventeen cells, a sanctum chamber, a flight of steps, an additional opening on the southern side and a water-reservoir on the back side.

The entire establishment has been badly robbed and some of the walls are even reduced to foundation courses. The construction is of bricks laid in clay mortar and the use of stone is restricted to the entrance, pillars verandah-kerb, steps and drain. Of the walls, the facing bricks are larger and smoothly chiselled with fine joints, while the core is made of courses of small bricks, generally following the courses of facing. The peripheral wall is 3 metres thick and rises in receding footing from foundation. A few pieces of bricks carved with floral designs have also been found in excavation, which suggests that the superstructure (which is totally missing) was ornamented with these bricks.

The monastery is facing east and is to be entered through a porch. Unlike the Ratnagiri monasteries the porch here does not project beyond the main peripheral wall-alignment. The door-frames and the other accessories of the entrance-gate arc missing, only a brick pylon raised upon a

stone base has partly survived on the southern side of the entrance. The porch is flanked by cells on either sides and opens into the verandah through a wide door-sill of stone-courses. This entry (1.30 metres wide) is flanked by pillars (2 m high), one each on the either side.

The entrance leads to a running quadrangular verandah (the width varies from 2.70 to 3 m in different wings) with four extensions (between comer cells of the four wings), facing the cardinal directions, thus have a plan like the megalithic cist. The verandah pillars rested upon a stone-kerb, which is 1.12 metres wide and 0.22 metres high, and built over base of two stone courses. The top course of this stone kerb is almost robbed. On the extant portion of the top course are the shallow chases upon which the verandah-pillars were erected and clamped with iron pins. The floor of the verandah is missing however, at one place in the southern verandah, traces of brick-grit ramming were noticed. The corner extensions of southern and western verandah are paved with bricks.

The courtyard is 1260 sq m and extended from the basement of the stone-kerb. The flooring of the courtyard is totally missing. The rain-water used to be channelled and drained out through an underground drain which passed through the northern verandah and turned towards east, projecting out from the eastern peripheral wall.

The verandah had on its back side cells, five each on the north and south, three on the east and four on the west. The width of the cells between the front wall to rear is 3 metres which varies minutely in the cells of the southern wing where it is 3'10 metres. The width of the sanctum cell and of its two flanking cells is reduced to 220 metres as here the rear wall has been made extra thick internally to check the water seepage from water reservoir, existing at its back wall. The length of the cells varies from 170 metres to 380 metres; however, the most average length varies between 280 and 290 metres. The length of the sanctum cell is approximately 4 metres.

Usually the verandah gives access to the cells but here the cells have been blocked from both the sides. It is therefore not clear how one entered the cells. It is supposed that levels of occupations of these cells were raised in successive periods and the whole raiment of the front walls was also renovated. Thus, at the time of renovation, the cell-openings of the earlier levels were flashed nicely leaving no traces of previous construction as exemplified in most of the leading monasteries in India, viz., Nalanda, Udayagiri, etc.

A staircase with four intact steps was found on the southern comer of the eastern wing approached through eastern verandah. This staircase may have been used when the occupational level shifted from ground floor to higher level.

An additional opening attached with the eastern verandah-extension on the south was exposed to a width of 1.67 metres. This opening had a two-leaf door as indicated by the presence of shallow stone sockets on either side behind the door sill. The doors were shut and locked from inside with *argala* (horizontal bars) as two sockets with stone casing were noticed in the right side jamb; the left side iamb was damaged.

A water-reservoir measuring 7.05 metres in length, 480 metres in width and 3 metres in depth was exposed on the back side of the monastery. The eastern boundary of this reservoir is formed by the western peripheral wall of monastery while the remaining three sides are enclosed by the natural rock-boulders. A low retaining wall was raised on the southern and northern side upon rock-boulder to check overflow of water from the sides.

Besides carved architectural members eight sculptures (all fragmentary except two tiny pieces) were found in the monastery area. Of the two intact pieces one represents four-armed Vishnu (pl. XXII A) and the other Mahishasuramardini (pl. XXIIB). The features of these images resemble folk art and these images entered here as folk deity. This again indicates that keeping of Hindu deities by the monks within Buddhist monastery was not forbidden as revealed from Nalanda as well. Another important antiquity from the site were terracotta/clay sealings, sixteen in number, all fragmentary. Of these sealings, thirteen are votive in nature, two seem to be monastery seals (not identified -one seems to be of clay) and one seal seems to bear the name of some individual. Among the terracotta finds, important is the fragment of a female figurine representing the mother and child motif, (pl. XXIIC). Among other finds are beads, two in terracotta, one in agate and one in jasper(?), circular stone disc with a hole in the centre, a fragment of dice-stick and fragment of an ear-lobe. Iron implements include a fragmentary arrowhead and sickle. Pieces of faience bangles were found mostly from the upper levels.

Pottery is found in plenty at the site. There is no painted pottery while red and black slip could be noticed. Among the pottery shapes are sprinklers, votive lamps, bowls, dishes, *kadahi* with handle, basins, *handi,* vases and spouts.

On the western side of the apsidal *chaityagriha* the road leading to sculpture shed obstructed further digging towards west and an area of about 2 metres width was therefore left unexcavated; however, portion of a brick wall was exposed during rains. With a view to exposing it further, a trench, one and half metre wide (east-west) and 24 metres long was dug. During the course of this digging one almost complete and twenty-five fragmentary sculptures representing Buddha in different poses (pl. XXIII A), one window-grill in stone depicting a snake with five hoods (pl XXIII B), one fragmentary stone inscription (47 x 35 x 6 cm) in Kutila script on *Pratitya-samutpadasutra* and a terracotta sealing probably bearing the name of some individual (pl. XXIIIC), were found. The sculpture depicting Buddha's descent from heaven (pl. XXIID), is of high artistic merit. Trial digging on the back side of the *matha* yielded a fragmentary inscription in Gupta characters.

In the mound LTG[4] in all 12 trenches of 6 x 6 metres were excavated. Remains of a later stone structure with two stone pillars could be seen on top of the mound below which were the remains of a brick structure, the ground plan of which is also disturbed. Since the area is full of rocky outcrop and the builders used these rocks as the base for laying the walls; as a result, traces of the walls could not be noticed in the area. However, it seems that there may have existed an oblong brick structure

(24 x 15.40 m) facing east with two wings of cells, and a passage in between. The northern wing is 6 metres wide while the southern wing is 7 metres in width. The passage in between is 2-30 metres wide. Outline of a cell was traced in the northern wing which measures 2-80 (north-south) x 3 metres (east-west).

71. EXCAVATION AT MANAMUNDA, DISTRICT PHULBANI.— C.R. Mishra and S. Pradhan of the P.G. Department of History, Sambalpur University, took up excavtions at Manamunda (20°51' N and 83°59' E) locally known as Asurgarh, located on the right bank of the river Mahanadi in the Boudh Tehsil of Phulbani district. The site was explored by the P.G. Department of History under the leadership of N.K. Sahu. It extends over an extensive area of about 1.5 km x 0.5 km between the right bank of the river Mahanadi and the State Highway No. 14 running between the Sub-Divisional headquarters of Boudh (Phulbani District) and Sonepur (Bolangir District). Sonepur, the metropolitan capital of the Somavamsis under the name Suvamapura is at a distance of about 3 kms from the site on the other side of the confluence. The local rulers ruling over Suvamapura region during the elevertth and twelfth century AD described this territory in their epigraphs as 'Lanka' and themselves as "Paschima Lankadhipati".

The site had been subjected to excavation in 1981 and 1983 when six trenches were taken around the periphery of the mound. The excavators (N.K. Sahu and S.C. Behera) reported the antiquities to the first century AD without reaching upto the natural soil.

The present excavation dug upto the natural soil yielded four occupational layers encountering the natural soil at a depth of 1.90 m from the surface. Layer 1 from the top was the surface humus with a deposit of loose brown earth. This being a deposit of only 0.20 m yielded a few sherds of inferior red ware along with pieces of tiles. Layer 2 with 0.40 m occupational deposit was characterized by a deposit of compact, hard and brown earth mixed with brickbats. The ceramic industry from this layer comprised sherds of inferior red ware more in number than layer 1 and pieces of tiles. They all appeared to be heavily weathered and on rubbing leave behind an ochrous colour on fingertips. At the base of the layer was a circular burnt brick structure with its pebble-paved floor. The antiquities from this layer were iron objects like nails, plates, hinges and beads. Lumps of charcoal and hearth were also traced in this layer and also inside the structure on the floor.

The underlying layer 3 with a deposit of compact black cotton soil measured 0·75m in thickness. A remarkable change in the ceramic industry was noticed in this layer. It yielded sherds of well-fired, well-potted, polished and slipped red ware with a variety of incised decoration, black ware and Black-and-red ware. The most important discovery from this layer was a silver punch-marked coin datable to the third century BC. The other antiquities include a few beads and a large number of iron objects like knife, dagger, spearhead, arrowhead, axe, nails, etc. This layer also rests on a pebble paved floor level with traces of burning activities (hearth) and lumps of charcoal. Bone pieces have also been collected from this layer.

Layer 4 is a deposit of 0 55 m resting above the natural soil. There was no marked difference from layer 3 in regard to pottery except the predominance of Black polished ware and Red-slipped ware. A few sherds of Micaceous red ware were also found from this layer. Besides iron objects, three microliths (blades) and a broken copper ring were found from as this layer.

Natural soil was dug to a depth of 0.45 m. It was a sticky brown earth.

A circular burnt brick structure belonging to layer 3 was also encountered. It measured 1.30 m on its exterior and 0 *%1* m in its interior. Making a cross-section of the structure excavation was continued upto a depth of 2.95 m where sub-soil water was encountered along with the base of the structure. The structure measured 2 .90 m in depth with 42 courses of brick masonry. This cylindrical brick pit yielded broken pieces of five large pots (storage jars). Two of them were wheel made and three handmade with beautiful floral decorations on their thick rim. Along with a few sherds of B lack-and-red ware there were four complete pots at the base of the pit (well -7). The other objects recovered from the pit were pieces of bone, charcoal, charred rice, one rectangular polished stone of whitish colour measuring 32 cm x 13 cm.

Another interesting feature of the site associated with Layer 3 was a stone appendage noticed in an eroded section. It measured U&2 m in diameter and had 35 boulders of various size and two broken bricks. Below the appendage was a pit cutting across the natural soil to a depth of 1.60 m from the stone circle and 2.10 m from the surface. The soil inside the pit was more compact, hard and black in colour and was devoid of any cultural material. The pit at the base yielded a thick broken red basin, patches of ash, a small piece of fragile bone near the basin and a piece of iron.

The ceramic industry of Manamunda comprised of red ware, black-slipped ware, Black-and-red ware and Red slipped and polished wares. The shapes in the red ware from layers 1 and 2 are mostly miniature vessles, bowls and basins, without any painting or decoration. The black-slipped, Black-and-red and Red slipped wares were found from layers 3 and 4. The red as well as the black-slipped wares in these layers were brightly polished, prepared out of well-levigated clay, wheel-turned and well fired having incised decoration. Some of the black wares had concentric grooves on the inner base with or without a central knob. Some of the red ware sherds had graffiti marks and were decorated with applique band of finger tip pattern, sometimes also with a cord. The popular decorative pattern however was the rectangular notches arranged in oblique rows, with a band of cord pattern, the other decoration being grain incisions in rows and fish patterns. The handmade thick sturdy red wares found from the brick pit were decorated with beautiful floral pattern on their rims.

The Black-and-red ware found in association with the black-slipped and red-slipped wares were altogether absent in layers 2 and 1. They are prepared of levigated clay, wheel-turned and well-fired and could be compared in fabric, texture and shape with the south Indian Magalithic Black-and-red wares. The Black-and red wares are without any decoration or paintings. The shapes are mostly bowls with their typical sharpened rims.

In all, the excavation yielded 49 antiquities. Iron objects which predominated the collection included axes, daggers, knives, spear and arrowheads, nails, door clamps, hinges, sickle, etc.

The other antiquities were a silver punch-marked coin found from the upper level of layer 3; five beads of semi-precious stones (camelian, quartz, and coral);and four microlithic blades and a broken thin copper ring from layer 4. The bricks used in the structures were well fired and were made up of clay mixed with husk and straw. They varied in length from 32 cm to 26 cm and breadth from 23 cm to 20 cm with an uniform thickness of 5 cm.

On the basis of stratigraphy, pottery analysis and other important antiquities two cultural phases have been worked out. Period I has two phases i.e. Period IA and Period IB as identified by the deposits of layer 4 and layer 3 respectively. Though the ceramic industry does not show any remarkable change, it is the antiquities like the microliths and copper objects from layer 4 and the Punch-marked coin from layer 3 and the pebble-paved floor level between these two layers that have led the excavators to such subdivisions of Period I. The ceramic industry of the site right from the beginning shows a general sophistication suggesting thereby that the people arrived here with an advanced material culture of the early historic period being equipped with the copper and iron technology alongwith, of course, the limited use of microliths. The period may tentatively be assigned to the third-fourth century BC because of its stratigraphic position below the punch marked coin with an occupational deposit of one metre in between.

Period II of Manamunda has been identified on the basis of pottery found from layer 2 and 1. Black and red ware and black polished ware of the earlier period ceased to exist and gave way to a degenerated red ware. B.B. Lai has also identified such a degenerated red ware stage at Sisupalgarh and assigned a period from the end of the second. century AD to the beginning of the third century AD.

The present site of Asurgarh near the village Manamunda was explored by the P.G. Department of History under the leadership of N.K. Sahu. It extends over an extensive area of about 1.5 x 0.5 km between the right bank of the river Mahanadi and the State Highway No. 14 running between the Sub-divisional Headquarters of Baudh (Phulbani district) and Sonepur (Bolangir district). Sonepur, the metropolitan capital of the Somavamsis under the name Suvamapura is at a distance of about 3 kms from the site on the other side of the confluence. The local rulers ruling over Suvamapura region during the eleventh and twelfth centuries AD described this territory in their epigraphs as "Lanka" and themselves as "Paschimalankadhipati".

The site had been subjected to excavation in 1981 when six trenches were taken around the periphery of the mound and the excavators reported antiquities datable to the first century AD without reaching the natural soil. In 1983, the P.G. Department of History, Sambalpur University took up another trench (MND-VII) near the Lift Irrigation point. During the latter excavations in a trench measuring 8 m x 8m, sherds of red ware, black polished ware, Black-and-red ware, inferior variety of N.B.P. (?), etc., alongwith a good number of iron objects and semi-precious stones were found.

The aim of the present excavation was to reconstruct the cultural sequence of the site by digging upto the natural soil, and to tap the site at all possible viable points.

During the current season four trenches MND VIII, MNDIX, MND X and MND XI were laid at different potential points of the mound. Trench MND VIII measuring10 m x 10 m was laid almost at the centre of the main mound. The excavation yielded four occupational layers encountering the natural soil at a depth of 1.90 m from the surface. Layer 1 from the top was the surface humus with a deposit of loose brown earth. This being a deposit of only 0.20 m yielded a few sherds of inferior red ware alongwith pieces of tiles. Layer 2 with 0.40 m occupational deposit was characterized by a deposit of compact, hard and brown earth mixed with brickbats. The ceramic industry from this layer comprised sherds' of inferior red ware more in number than layer 1 and pieces of tiles. They all appeared to be heavily weathered and on rubbing leave behind an ocherous colour on the finger tips. At the base of the layer was a circular burnt brick structure with its pebble-paved floor level which was encountered in the northern quadrant of the trench. The antiquities from this layer were iron objects like nails, plates, hinges and two beads. Lumps of charcoal and hearth were also traced in this layer and also inside the structure on the floor.

The underlying layer 3 with a deposit of compact black cotton soil measured 0.75 m in thickness. A remarkable change in the ceramic industry was noticed in this layer. It yielded sherds of well-fired, well-potted, polished and slipped red ware with a variety of incised decoration, black ware and Black-and-red ware. The most important discovery from this layer was a silver punch-marked coin datable to the third century BC. The other antiquities include a few beads and a large number of iron objects like knife, dagger, spearhead, arrowhead, axe, nails, etc. This layer also rests on a pebble paved floor level with traces of burning activities (hearth) and lumps of charcoal. Bone pieces have also been collected from this layer.

Layer 4 is a deposit of 0.55 m resting above the natural soil. There was no marked difference from layer 3 in regard to pottery except the predominance of black polished ware and red slipped ware. A few sherds of micaceous red ware were also found from this layer. Besides iron objects, three microliths (blades) and a broken copper ring were found from this layer.

Natural soil was dug to a depth of 0.45 m. It was a sticky brown earth.

At a distance of 89 m towards east from the main trench (MND-VIII) on the eroded section of the river a trench of 5 m x 5 m was taken just above a heap of brickbats in order to know the nature of the brick deposit. At a depth of 0.30 m i.e., below a thin deposit of sand and silt a circular burnt brick structure was encountered. It measured 1.30 m on the exterior and 0.87 m in. its interior. Making a cross-section of the structure, excavation was continued upto the depth of 2 *95* m where subsoil water was encountered along with the base of the structure. The structure measured 2.90 m in depth with 42 courses of brick masonry. This cylindrical brick pit yielded broken pieces of five large pots (storage jars/urns -?). Two of them were wheelmade and three handmade with beautiful floral decorations on the thick rim. Alongwith a few sherds of Black-and-red ware there were four complete

pots at the base of the structure. The other objects recovered from the structure were pieces of bone, charcoal, charred rice, one rectangular considerably big polished stone of whitish colour measuring 32 cm x 13 cm.

The trench MND X was taken at a distance of 1 -93 m from the main trench on its western side. A trench of 5 m x 5 m was taken just above the stone appendage which was noticed in the eroded section. At a depth of 0.50 m a circular stone appendage was encountered which comprised of 35 boulders of various size and two broken bricks with a diameter of 1-32 m (east-west) and 1.30 m (north-south). The deposit above the appendage was compact, hard, black soil yielding sherds of inferior red ware, black-polished ware and a few sherds of Black-and-red ware.

Below the appendage was a pit cutting across the natural soil to a depth of 2.10 m from the surface and 1-60 m from the stone appendage. The soil inside the-pit was more compact, hard and black in colour and was devoid of any cultural material. The pit at the base yielded a thick broken basin of brick-red colour that left an ochrous colour on the finger tips on rubbing, patches of ashy black soil, a small piece of fragile bone near the basin and a piece of iron.

At a distance of 36 m from the main trench towards east a 5 x 5 m trench was taken on the eroded section of the river. There were eight boulders here in-situ forming almost a circle, along with three displaced boulders of identical size now lying below on the bed of the river. Making a cross section of the stone-circle, the northern half was excavated. At a depth of 0.80 m from the surface, pieces of bone, charcoal, and fragments of black-and-red ware, Red-slipped ware and black-polished ware were recovered. The other antiquities from this trench were only an iron knife, lower portion of a sickle and some unidentified iron plates. These stone circles, which were clearly Megalithic burials belong to the punch marked coin level of the main trench.

The ceramic industry of Manamunda comprised of red ware, black-slipped ware, black-and-red ware and Red slipped and polished wares. The shapes in the red ware from layers 1 and 2 are mostly miniature vessles, bowls and basins, without any painting or decoration. The black-slipped, Black-and-red and Red slipped wares were found from layer 3 and 4. The red as well as the black-slipped wares in these layers were brightly polished, prepared out of well-levigated clay, wheel-turned and well fired having incised decoration. Some of the black wares had concentric grooves on the inner base with or without a central knob. Some of the red ware sherds had graffiti marks and were decorated with applique band of finger tip pattern, sometimes also with a cord. The popular decorative pattern however was the rectangular notches arranged in oblique rows, with a band of cord pattern, the other decorations include grain incisions in rows and fish pattern. The hand-made thick sturdy red wares found from the brick pit were decorated with beautiful floral pattern on their rims.

The Black-and-red ware found in association with the black slipped and red slipped wares were altogether absent in layers 2 and 1. They are prepared of well levigated clay, wheel-turned and well-fired and could be compared in fabric, texture and shape with the south Indian Megalithic Black-and-red wares. The Black-and red wares are without any decoration or paintings. The shapes are mostly

bowls with typical sharpened rims.

In all, the excavation yielded forty-nine antiquities. Iron objects which predominate consist of axes, daggers, knives, spear and arrow-heads, nails, door clamps, hinges, sickle, etc. The other antiquities were a silver punch-marked coin found from the upper level of Iayer3;five beads of semiprecious stones (camelian, quartz, opal and coral); and four microlithic blades and a broken thin copper ring from layer 4.

The excavation brought to light two brick structures; one in Trench VIII and another in Trench DC. The structure in Trench VIE was circular in plan, the outer diameter being 6.90 metres and the inner diameter 6.20 metres. The bricks used in the structure were well fired and were made of clay mixed with husk and straw. They varied in length from 32 cm to 26 cms and in breadth from 23 cm to 20 cm with an uniform thickness of 5 cm. The pebble-paved floor inside the brick structure was at a distance of 26 cm to 30 cm from the circular wall. Traces of burning activities (hearth) were noticed inside the structure. Only two post holes could be traced. Broken tile pieces from layer 2 suggest that the circular structure had a tiled roof. The structure stratigraphically belongs to period II.

The second structure, in Trench No. DC, was a circular brick pit (well-?) measuring 2.90 metres in depth having an inner diameter of 0.87 m and outer diameter of 1.30 m.

The structure had forty-two courses of burnt bricks made of clay mixed with husk and straw. The bricks used in this structure measured 30x25x9 cm. At the base of the structure sub-soil water was encountered and there were four pots placed on a pebble surface. Two pots were filled with sand and other two were filled with clay which on floatation yielded charred rice and fragments of bone. These four pots were superimposed by the sherds of thick fabric hand-made as well as wheel-turned large size pots with their very beautifully decorated rims. A few sherds of Black-and-red and black-slipped wares were also recovered from this deposit. The deposit of the potsherds continued from the bottom to a thickness of 1.25 m reaching upto the twenty-third course of the structure from the top. The other associated objects found from this deposit were lumps of charcoal, pieces of bone and a polished rectangular stone measuring 32 x 13 x 13 cm. It is very difficult to associate the structure with any occupational layer of the mound because its upper portions and the sealing layers have already been washed away by the .river. During the 1981 excavation two such cylindrical structures with almost identical deposits had been reported, in one structure the pots (five complete and two broken) had been placed one upon the other resting on a rectangular brick platform.

On the basis-of pottery and other important antiquities the two periods: Period I and Period II have been identified. Period I had two phases i.e., IA and IB. The beginning of Period I may be tentatively dated to *circa* fourth-third century BC since it is stratigraphically below the punch-marked coin with an occupational deposit of one metre in-between.

The megaliths characterized by the stone-circles may be assigned to this period. Period II could be assigned the date from the end of the second century AD to the beginning of the third century-AD.

PONDICHERRY

72. EXCAVATION AT ARIKAMEDU, PONDICHERRY.—Excavations were undertaken at Arikamedu, in the Union Territory of Pondicherry, by Vimala Begley of the University Museum, University of Pennsylvania, and K.V. Raman of the Madras University, for the purpose of better understanding the history of maritime trade and refining the internal ceramic chronology of the site. Other members of the American team were Elizabeth Lyding Will from Emherst College, and Steven E. Sidebotham of the University of Delaware. As part of the programme, amphoras from previous excavations at Arikamedu were examined by Elizabeth Lyding Will with a View to .understanding the history of trade as well as the chronology of Arikamedu. It was observed that Arikamedu amphoras were in part Greek containers for wine from the islands of Kos, Knidos and Rhodes dated to the first century BC and perhaps even the second century BC; and in part Roman Campanian imitations of Koan products. In addition to wine jars, she also identified a few fragments each of Spanish jars *for garum* (a Roman fish sauce) and Olive oil, and olive oil Jars from the Istrian peninsula in the northern Adriatic, suggesting thereby that south India had either developed a taste for such products or there was a demand for them among the members of Roman trading community resident at Arikamedu. None of the pieces examined by her are later than the first century AD. It was also reported by her that several Greek Koan pieces at Arikamedu are covered with patches of what appears to be the water-resistant pozzolana cement, which was used by Romans in the construction of underwater installations; they also used amphora pieces as "bricks" in such- constructions.

The excavations were limited to four small trenches, 2x3 metres each, one of which proved to be sterile. All trenches were located in the Northern Sector, an area which is much disturbed by the activities of the villagers and erosion of the bank along the Ariyankuppam river. In addition, a partially exposed brick structure was cleared, which turned out to be two brick enclosures, perpendicular to each other, measuring 1.80 x 1.04 and 1..40x 0.85 metres on the inside (pl. XXIV). The enclosures are close to the river front; not an unusual feature at Arikamedu, but neither the structural form nor associated finds indicate their function. Although they are partially similar to the brick-lined tanks and pits found by Mortimer Wheeler and J.M. Casal in earlier excavations which arc considered to have been used for dyeing of textiles, the present examples could not have been intended for mat purpose, for there are no indications of paved floors or drainage outlets. The pottery assemblage from the brick enclosures is comparable to that from the 'intermediary[5] levels of Casal's trenches excavated in the Southern Sector between 1947-50, where rouletted ware and related ceramics are introduced into the predominantly "Megalithic" pottery tradition. According to present dating of Arikamadu, the pottery assemblage from the brick enclosures would be of the second to

early first century BC. If there were other structures related to these enclosures they would have been towards the west, closer to the river bank, for trench A V90-III plotted 0 80 metre to the east contained sterile sand.

Trench AV 90-1, plotted due east of Wheeler's AKII and Casal's Group III was excavated to fresh water level but virgin soil was not reached during this season. No architectural features were discovered *in situ* but large quantities of brick fragments and pottery were recovered, including a few sherds of terra sigillata and Mediterranean amphora. Severe disturbance across the site noted by earlier excavators was evident here as well. In loci lower than *020* the pottery paralleled many forms and fabrics from Wheeler's "Arretine" and "pre-Arretine" levels of the Northern Sector. Trench AV90-II was plotted due south of Wheeler's AK II and Casal's Group III and as close to the river as possible in the hope of better understanding the plan of the commercial section close to the river. While this trench revealed architectural features—two walls and the remains of a ring well—there was a noticeable dearth of pottery. Trench A V90-IV was plotted away from the river front in an area where over a metre of dirt had been removed earlier by the land owner. The trench contained much pottery and broken bricks from disturbed deposits.

Among the artifacts found are stone and glass beads—two of which have traces of gold leaf-glass bangles, a crystal bead or pendant with two perforations, and a bone stylus or cosmetic stick. In terracotta are gaming pieces, discs, spindle whorls, and a large quantity of pottery - over 10,000 sherds from trench A V90-I alone. The limited excavations have shown distinctive patterns of pottery assemblage in different trenches. Especially noticeable are differences in the ratio of specific pottery fabrics and forms, such as the so called "Megalithic" Black and red ware, chalky grey ware and rouletted ware, between Trench AV-90-I and the brick enclosures. Such differences could be significant for understanding the layout of the settlement, more specifically the organization of its space, but pottery from a larger area of excavations should be sampled before a convincing hypothesis can be proposed.

The Department of Ancient History and Archaeology, University of Madras carried out excavations at Arikamedu in the Union Territory of Pondicherry, under the directorship of K.V. Raman, in collaboration with the American team led by Vimala Begley of the University Museum, University of Pennsylvania.

Four trenches measuring 3 x 2 metres were plotted in the northern sector in order to trace the extent of the port area. Section scraping was also done at a place near the exposed tank-like structure found on the southwestern side of the northern sector of the site. The trenches AV 90-1, AV 90-11 and AV 90-IV yielded pottery of different types such as Rouletted ware, Black-and-red ware, black ware and red ware. Few terra sigilatta sherds without stamps were picked up from AV 90-H. Besides these, there were also sherds of dull grey ware, urns, storage pots and pieces of conical jars and finger grooved tiles with a hole at the centre meant to tie them on the rafters supporting the roof. But the trench AV 90-111 is devoid of much pottery and is full of sand deposit. The forms and fabrics of the

pottery recovered from the trenches AV 90-1, AV 90-11 and AV 90-IV are of domestic types similar to that of Mortimer Wheeler and Casal's excavation yields. There are few sherds with grafftti. There is a sherd with Tamil Brahmi letter. A full black and red ware deep dish and a full red slipped ware deep bowl were picked up from a depth of 94 metres of the tank. Few pieces of double handled amphorae were also found.

The trench AV 90-1 exposed a portion of the mud wall structure and few rings at the lower level of a ring-well found in the trench. The structure revealed out of the section scraping (SS-I) consists of two rectangular tanks constructed at right angles. Of the two tanks, the bigger one with east-west orientation measured 2.33 metres in length on the east-west and 1.62 metres in breadth of the north-south. There are 16,14,15 and 10 courses of bricks respectively on the southern, northern, eastern and western sides. The size of the bricks of this tank was 44 x 28 x 6 cm. The smaller tank measured 2-01 metres in length on the north-south and 1.32 metres in breadth on the east-west. This tank had fifteen courses of bricks on the northern side, 9 courses on the southern side and 14 courses each on the eastern and western sides. Though the inner sides of the tanks were plastered, the outer is devoid of it. There is an outlet at the lower level of the western side of the big tank measuring 10x6 cm. The patinations on the inner side of the tanks beside the out-let suggest the structure to be dyeing-vats. Similar but separate structures were already reported by Mortimer Wheeler.

The occurrence of the terra sigilatta ware, pieces of double handled amphorae and the existence of the tanks beside other antiquities suggest not only the promising extension of the port area but also the existence of the industrial site.

PUNJAB

73. EXCAVATIONS AT SANGHOL, DISTRICT LUDHIANA.—In continuation of the previous season's work *(1988-89,* pp.69-73) the Excavation Branch-H of the Survey in collaboration with the Department of Cultural Affairs, Archaeology and Museums, Government of Punjab, Chandigarh, resumed excavations at Sanghol, under the joint direction of C. Margabandhu and J.P. Srivastava assisted by I.D. Dwivedi, G.S. Gaur, R. Krishnaiah, L.S. Mamani, V.R. Verma, Vinod Kumar, Chandra Bhan, Keshar Singh, D.D. Dogra and V.K. Kaul of the Survey and K.K. Bisht,.Kuldeep Singh, Gurdev Singh and Heera Singh of the Department of Archaeology and Museums, Government of Punjab.

This season's work had the following objectives: i) to further trace the expansion of the additional brick buildings on the north-western side of the Hathiwada (SGL-1) mound along with the palace complex; (ii) to check up the existence of the mud-rampart on the nor:h-westem side; (iii) to obtain full details of the structural features, after removing the baulks, both of the palace complex and the religious area; (iv) to expose the plan of the monastic complexes and the stupas discovered

at SGL-5 and SGL-11; and (v) lastly, to ascertain the stratigraphic position of the various structures and to correlate and co-ordinate the entire work as this being the final season.

In the area palled the Palace Complex, apart from the additional brick buildings traced adjacent to the assembly hall, a few trenches on its north-western comer were laid for checking the portion wherein a large number of Kuninda terracotta coin moulds were found in the last season's work. The extension of mud rampart on the northern side of the Hathiwada mound was also to be ascertained, in addition to the removal of baulks to fully expose the remains of the structures.

To the immediate north of the brick building consisting of small chambers, a circular furnace built over a platform made up of very compact clay and forty terracotta moulds of Kuninda coins were found. These moulds pertain to the Amoghabhuti type datable to the first century BC. The discovery of this furnace along with Kuninda moulds around it, suggests its use as a mint or so. A furnace was also met with during the last season's dig. However, the area was quite small and it required further evidence to confirm.

After removal of the baulks, fourteen brick-built small chambers on the same level with floors made of lime and clay, in uniform pattern, were exposed which represent possibly an official building relating to treasury or mint as the available finds indicate. To the east of this group of structures is the main platform which may denote an Assembly (pl. XXV A) or a hall of audience.

Contiguous to the Assembly Hall oh the north-west comer stands, as stated, this brick building, neatly built by massive brick wall ranging in thickness from 0.75 to 0.90 m and the building itself measures 16x 12-50 m. The rooms were provided with thick successive lime floors mixed with surkhi, red gravel and lime. In all probability, this large building may have been used to keep important records and transactions of the State. It is also not unlikely that some of these rooms may have been used for non-residential purposes. An interesting feature of these chambers is that all these were filled with fine textured clay, when they fell into disuse. The filling was found upto the top of the wall which possibly indicates complete levelling of this area in the later Kushana period.

The chambers of this complex range in dimension from 6.45 x 2-30 m to 210 x 1.90 m. The chambers in between slightly vary from one another. The Assembly Hall and these chambers of the buildings stand damarcated by an east-west long wall.

In the pre-Kushana horizon was found the Kuninda coin moulds on a high platform consisting of very compact and sticky clay, built directly above the natural soil.

The comparative stratigraphical position suggests that the earliest floor of the Assembly Hall was raised over a deposit which is contemporaneous with the additional 'office' building and thereby envisaging a slightly earlier date to the construction of this building. This apart, it is also clear that the Assembly Hall survived upto the late Kushana period, whereas the 'official' building had fallen into disuse.

On the western and southern sides, no remains of fortification could be traced. Chronologically,

the foundation of the fortification was laid in the first century BC and it was subsequently raised in Kushana period in two phases.

In the area of the Assembly Hall-cum-Palace Complex, (pl. XXVI A) in this season, the work was mainly confined to the removal of baulks and finding out, if possible,, the demarcating line between the Assembly Hall and the 'office' complex. The emergent picture of the Assembly Hall and 'official' building is much clearer after removing the baulks.

The entire structural complex, Assembly Hall and 'official' buildings measure 43 x 20 m, on the east-west and north-south, respectively.

The Assembly Hall, measuring 18.25 x 15.50 m, was built in three successive structural phases commencing from the early Kushana to the late Kushana times. These phases are represented by thick massive brick laid floors, mostly in single course. Occasionally, more than one course was also noticed. The floor, was not laid uniformly, but in blocks, demarcated by thin walls and, therefore, possibly showing, its extension with short time gaps. Numerous post-holes were made on the floor to accommodate wooden posts for supporting the timber structures and roof. On the southern fringe, a narrow strip of floor was separated by an east-west running wall and the resulting area was divided into almost one metre square divisions providing the seat for the main authority to preside. Such seats were also built on the floor which were raised upto 10-20 cm or so.

Through the northern entrance runs a north-south oriented brick laid pathway along the eastern extremity of the Assembly Hall (pl. XXV B). This pathway was lined on either side by bricks-on-edge and was paved with brickbats, etc. Near the south-east comer this pathway gradually turns towards west and runs east-west and ultimately joins the second pathway running north-south almost in the middle of the Assembly Hall.

On the north-east area of the Assembly Hall were traced four equally distanced post-holes (pl. XXVII A) cut out in bricks, to accommodate wooden post for holding a canopy over an elevated seat, possibly for the presiding person as its central position suggests.

The religious complex (pl. XXVI B), comprised of eleven fire altars, and two platforms with dimensions of 14.35 x 17.75 m and 13.10 x 5 .30 m, on its north and south respectively and a strip-like wall of 3.25 m width running east-west, 10.35 m in length attached to the western end appears to be a place for performance of specific rites of religious character.

All the eleven fire altars were found containing ash mixed with charred grains generally used in performing the rituals. The report on palaeobotanical evidence from the altars is awaited.

Apart from these, two off-sets were provided to each fire altar. In some of the fire altars, especially Nos. 2 and 10 extensions were also provided with. The area resulting from this may possibly have been used for the purpose of keeping the ritual materials, etc. As regards the dating of the religious complex, the structure could be assigned to the first century AD on the basis of typical Kushana pottery and antiquities like Kushana copper and gold coins, including those of Vima

Kadphises, Indo-Parthian copper coins of Gondopharnes and typical Kushana terracottas. There are, however, some layers and floorings preceding the religious complex and could be dated to the first-second century BC.

Other important antiquities found from this complex include handled pottery, ladles, *sankha* modelled in terracotta, terracotta votive tanks, balls, knife and perforated pot of copper, etc.

In continuation of the previous year's *(1988-89,* p. 73) work at SGL-5, it was felt that the area beyond the monastery exposed towards the north of the stupa is still traced continuing across the main baulk in the fields, a portion of which is at elevated part of the land. In SGL-5, trenches were therefore further extended to the north of the excavated stupa and the remains of some structures like cells, brick floor, verandah and pillar bases were exposed. This area is under cultivation and much of the remains are therefore lost. At places, a well laid out drainage system was also noticed.

A hoard of 178 copper *kota* and *kapa* coins datable to the sixth century AD were recovered. Other antiquities include copper coins of Kuninda and Kushana rulers, a few terracotta animal figurines, beads, balls, etc.

At SGL-11, the exposed monastery contains 27 cells of various sizes. There is only one row of cells on three sides, while the eastern side has two rows of cells. The monastery exposed so far measures 39x 36 metres, and is rectangular in plan. The width of the outer wall of the monastery is 0.70 metres. A 2..40 m wide entrance on the southern side was also observed. In front of the cells, a verandah, divided into seventeen parts of variable sizes was also exposed.

Further, in SGL-11 a circular small stupa was exposed in the last season; however, the remains of monastery have not been fully excavated and the work was therefore resumed again in this season.

A newly discovered stupa (S-2) of *Dharmachakra* pattern has a square plan measuring 8-50 x 8-50 metres. This platform was erected for strengthening the entire stupa from outside. A flight of steps is on the southern side. The inner *pradakshina-patha,* almost a metre wide, was also exposed. The stupa has three tiers intersected by 24 and 12 spokes in the outer one, while the third inner one could not be excavated. The bricks measuring 36x 6 cm were used in English bond in mud-mortar. This stupa is 20 metres away from the previously excavated stupa (S-1) towards the south-west and has been exposed only in half within the available portion but may be traceable in fields after further extending the excavated area.

A third stupa (S-3) on the south-east side of the above mentioned monastery at SGL-11 was also brought to light. Only a small portion of this stupa with tiers and spokes (pl. XXVIIB) was exposed, as the adjoining area is under cultivation.

Notable antiquities found from this season's excavations include terracotta human (pl. XXIX A-B) and animal figurines (pl. XXDCC), varieties of stamps, some with geometric patterns; animal headed spouts (pl. XXIXD), etc., other objects in terracotta include cart frame and wheels, gamesman, votive tanks, dabbers, crucibles, ear-studs (pl. XXVIII A), etc. Objects of shell include

large number of bangles decorated with geometric and floral patterns (pl. XXXA). Objects of bone and ivory include points, antimony rods and hair pins, some with animal-headed designs (pl. XXX B), styluses, dice, pendants, buttons, etc. Beads made from different materials and numerous shapes and types bespeak rich artistic traditions and aesthetic taste of the times; foremost are those made from semi precious stones (pl. XXVIII B) such as agate and camelian, chalcedony, quartz and crystal (pl. XXX C), garnet, jasper and lapis lazuli. Many etched beads were made from agate and camelian. Other materials used for beads include glass, faience, shell (pl. XXX D), paste, copper, bone and terracotta. Bangles of copper, shell and glass, copper antimony rods, ear-rings, buttons, pendants, etc., were other finds. Gold is represented by a coin of Vima Kadphises and small pieces of gold foil; iron objects include knife, three-pronged arrowheads, other domestic objects such as ladles, spoon, etc.

The Department of Cultural Affairs, Archaeology and Museums, Punjab, resumed excavations at Sanghol in collaboration with the Survey under the overall directorship of C. Margabandhu of the Survey. The Punjab team was represented by K.K. Rishi and Kuldip Singh, assisted by Gurdev Singh and Hira Singh. Excavations were continued at SGL-5 and SGL-11 for unearthing the complete plan of the stupa and monastery complexes which were partially exposed during earlier excavations. Details of the excavated sites are as under:

Excavations at SGL-11 were initiated in 1986 and portions of a stupa which is on a *dharma-chakra* pattern and part of monastery around it were unearthed on the northern side. The stupa had two tiers, the inner tier having four spokes and the outer tier eight spokes with interspaces filled with *kankar-remmed* earth. The square platform was strengthened with three base walls on each side filled with rammed earth. Some of the cells and verandah were partially exposed.

During current season, excavation was extended towards southern side and remaining portions of the monastery complex was exposed and several cells were unearthed. The complete rectangular plan of the monastery complex (barring some unexcavated portions on eastern and western side) was exposed. The *dharma-chakra* shaped stupa rests on a square platform measuring 8.50 x 8.50 m which was built for strengthening the stupa from outer side. There is a flight of steps from southern side. One metre wide inner *pradakshina-patha* around the stupa was also exposed.

On the southern side of the stupa are four cells, two on each side of a 2.40 metre wide pathway which leads to the stupa. These cells could be entered from the pathway and were perhaps meant to keep articles of worship by the monks. The *second pradakshina-patha* which is 1.50 m, 3.50 m, 3m wide respectively on the western, eastern and northern sides and enclosed within brick-on edge was also traced. On the outer side of the *pradakshina-patha* was noticed brick floor perhaps representing a compound.

In this rectangular monastery, twenty-seven cells varying in size and shape were exposed. While some of the cells are very small and the others are larger. A peculiar feature of the monastery was that while there was a single row of cells on three sides, on the eastern side there were two rows of

cells. The monastery is rectangular on plan and measures 39 x 36 m. The width of the outer walls of the monastery is 70 cm. In the foundation only ghost walls were noticed at some places. On the basis of the ghost walls the entire plan of the stupa and monastery complex could be reconstructed. There was a 2-40 m wide entrance to the monastery from the southern side. In front of the cells a verandah divided into seventeen parts varying in size was also exposed. Similar monasteries have been reported at Taxila (now in Pakistan). The verandah was approached from the compound mentioned above. The verandah and the cells were perhaps used as the abode of the monks. Major portions of the monastery were exposed leaving some portion on north-east and south-west comer unexcavated since the land was privately owned and the owner did not permit excavation in the area.

A depression was noticed on the outer side on the north-west comer of the monastery complex which was filled with debris. A brick wall about 1 metre wide and narrow at the base and wider on the top was unearthed in this comer which was perhaps raised to check flood water damaging the comer and periphery of the monastery complex.

With a view to locating more details of the area around the monastery, some trenches to the south of the monastery were laid resulting in the discovery of another Buddhist stupa (S-2) of the Kushana period on *dharma-chakra* pattern. This discovery corroborated the description given by Hiuen-Tsang, who travelled India during the time of Harsha Vardhana (AD 606-647); the Chinese pilgrim in his account mentions that there were 10 stupas and monasteries at She-tu-to-lu (now Sanghol). The recently discovered stupa is built of baked bricks measuring 36 x 22 x 6. cm and has three tiers intersected by 24 and 12 spokes in the outer ones while the third inner tier could not be exposed due to paucity of space. The stupa has been badly damaged due to brick robbing and at certain places only ghost walls were noticed based on which plan was prepared. This stupa is 20 metres away from the previously excavated stupa (S-l) towards south-west side.

'Some more probing was done on the south-east side of the monastery and a third stupa (S-3), circular on plan and *dharma-chakra* pattern was brought to light. Only some portions of the stupa with tiers and spokes could be exposed since the other portions of the stupa are under cultivation and could be subjected to excavation. On the western side of this stupa some ghost walls were noticed, which probably represent portions of cells. Bricks-on-edge were also noticed just in the alignment of the pathway of the main monastery complex. This stupa was also badly damaged due to ploughing and brick robbing.

During excavations, copper coins of the Kunindas, Kushanas, Hunas, terracotta sealing, stamps, beads, cakes, pendants, crucibles, animal figurines, bone styluses, points, iron objects, arrowheads, etc., were recovered. An inscribed broken bowl of the Kushana period containing letters in Kharoshthi script was also recovered from this site.

Some areas at SGL-5 which are under cultivation on the northern side of the stupa were excavated with a view to exposing the extension of the monastery complex which had been exposed during the preceding years. During the last year's excavation it was observed that some walls of the

monastery oriented east-west and north-south were exposed. The outer wall is one metre wide; only some traces of this wall could be noticed since the entire area has been badly damaged due to ploughing. Outline of structures like cells, verandahs and brick flooring and some brick-built bases of pillars were also exposed. The monastery seems to be rectangular on plan with living quarters for the monks, a kitchen, an assembly hall, open courtyard and bathing place. Drainage system was also noticed.

Copper coins of Kushanas, Kunindas, terracotta objects like beads, animal figurines, balls, etc., besides large quantity of pottery of Kushana period was found. A hoard of 178 coins of copper of .'Kot and Kapa' variety buried in Kushana incurved bowl (broken) were also recovered.

RAJASTHAN

74. EXPLORATIONS AROUND JAISALMER.—A Middle Palaeolithic site was discovered one km north of Bariyari and 72 km south of Jaisalmer on the Jaisalmer-Barmer road by S..N. Rajaguru, Sheila Mishra, Savita Ghate and Nitin Karmalkar of the Deccan College Post-graduate Research Institute, Pune, during explorations around Jaisalmer. The artefacts occur on the surface of a small quartzite ridge on the west side of the road. A particular pinkish quartzite with spots which occurs as veins in the quartzite had been used for the artefacts. The low-lying land consists of Tertiary bentonitic clays which are presently being mined. The presence of impervious Tertiary clay at the foot of the hill might have favoured the accumulation of water in hill slope depressions on the pediment surface during human occupations. The artefacts are weathered and a few show wind abrasion and traces of desert varnish. Ten flakes, seven of them with edge' retouch and two prepared cores are the major components of the surface collection. This site is important for the evidence it provides of-palaeolithic occupation of an arid zone in the western part of the Thar desert during the Early Late Pleistocene.

TAMIL NADU

75. EXPLORATIONS .IN DISTRICT CHENGAI ANNA.— G. Thirumoorthy of the Madras Circle of the Survey in the course of village-to-village survey in Madurantakam taluk of Chengleput M.G.R. District discovered the following:

Village/Site	*Nature of remains*
Acharappakkam	Wood fossils, middle palaeolithic tools, microliths; neoliths; megalithic burials of cairn circle type, early medieval habitational site; Atchiswara (Siva) temple of Pallava period and seventeenth century *linga* and Nandi sculpture

Village Site	*Nature of remains*
Agil	Megalithic burials of cairn circle type, early historic habitational site, glazed ware of late medieval period.
Alapakkam	Loose sculptures of Ganesa (nineteenth century).
Ammanur	Medieval habitational site
Anaikunnarn	Microlithic tools, neolithic tools, Megalithic burials of cairn circle type, *linga* and Nandi sculpture (seventeenth century)
Attivakkam	Megalithic cairn circles, early medieval habitational site, porcelain (seventeenth century)
Chintamani	Medieval habitational site
Endathur	Late Stone Age tools, megalithic stone circles, cairn circles and dolmenoid cist type, early historic habitational site
Gudalur	Megalithic cairn circles, medieval habitational site, Brahmanical loose sculptures of seventeenth century
Gudapakkam	Medieval habitational site yielding glazed ware
Kalanipakkam	Middle palaeolithic tools, megalithic cairn circle and dolmenoid cists
Kattugudalur	Early historic habitational site, late medieval glazed ware Tamil inscriptions and sculptured stone slabs of eighteenth century
Kattukaranai	Late medieval glazed ware Late
Kilmaruvathur	medieval sculptures Early medieval
Kilamur	habitational site
Kiliyanagar	Early historic habitational site, late -medieval temples of Ganesa, Vishnu and Siva, Tamil inscriptions of seventeenth century, late medieval glazed ware
Kottaikavapakkam	Early medieval habitational site
Madur	Loose sculpture of Muruga (eighteenth century)
Mattur	Early medieval habitational site, late medieval Vishnu temple, late medieval glazed ware
Mogalvadi	Megalithic cairn circles and urns, late medieval glazed ware
Morapakkam	Megalithic cairn circles, late medieval Vishnu temple and loose sculptures
Muniyanthangal	Megalithic cairn circles

Village Site	*Nature of remains*
Nemam	Middle palaeolithic tools, late medieval glazed ware and porcelain
Orattur	Early historic habitational site, loose sculptures including *linga* and Durga of Pallava period, ruined sixteenth century Siva temple.
Padiri	Megalithic urn burials, thirteenth century Siva temple and late Chola Tamil inscriptions
Pallipettai	Lower and Middle Palaeolithic tools, microliths, neolithic tools, megalithic cairn circles, late medieval habitation site
Pammaiyarnabattu	Late medieval sculptures,
Pasunkaranai	Early medieval habitation site and late medieval sculptures
Puliyani	Early medieval habitation site and eighteenth century Tamil inscription
Ravuttanallur	Late medieval sculptures Early
Sempundi	historic habitation site
Tandarai	Early historic habitation site and Durga sculpture of Pallava period
Timmapuram	Early medieval habitation site, late medieval glazed ware
Tirumukkadu	Wood fossils, early historic habitation site, late medieval sculptured stone slab
Tittaiam	Late medieval sculptures
Tuduvalampattu	Megalithic cairn circles
Uttamanallur	Middle, palaeolithic tools, megalithic cairn circles with sarcophagus and early historic habitional site
Vaippanai	Eighteenth century Brahmanical sculptures
Vitangadu	Early historic habitation site, late medieval *linga* and Nandi
Velamur	Sanskrit inscriptions of Vijayanagara period

76. EXPLORATION IN DISTRICT COIMBATORE.—The Pre-historic Branch of the Department of Archaeology, Government of Tamilnadu, explored the village Edayarpalayam in the Coimbatore taluk. At a place locally known as Beerangi Medu of this village a cist burial was noticed and a large number of antiquities were collected from it. The antiquities include sherds of Russet-coated ware, Black-and-red ware, black-slipped ware, iron slag and shell bangle pieces.

77. EXPLORATION AT ONBATHARU, DISTRICT COIMBATORE.—At a site called Onbatharu which is about 16 kms from Udumalaipettai a large number of dolmens were noticed on a small hill by the Department of Archaeology, Government of Tamilnadu. As quarrying was in progress, most of them were found destroyed.

78. EXPLORATION AT THIRUMALVADI, DISTRICT DHARMAPURI.— A menhir about 10 feet (3.048 m) in height was located by the Department of Archaeology, Government of Tamil Nadu, at Thirumalvadi in the Palacode taluk. It is locally known as 'Yanaikattunkal' (the stone used to tie the elephant). According to local legend this stone was used to tie the elephant which comes out from the adjoining forest.

79. EXPLORATION IN DISTRICT NORTH ARCOT.— K. Moortheswari of the Madras Circle of the Survey in the course of village-to-village survey discovered the following:

Taluk	*Village*	*Nature of remains*
Gudiyatham	Ammundi	Brahmanical sculptures of Vijayanagara period
-do-	Kallapadi	Siva temple (Chola period)
-do-	Kalapathur	Pillared *mandapa* (Nayaka period)
-do-	Melpatti	Tamil inscriptions (Nayaka period) Saptamatrika
-do-	Katpadi	sculptures (Pallava period)
-do-	Sevur	Tamil inscriptions of Chola period
Vellore	Abdullapuram	Medieval architectural remains
-do-	Maganipattu	Tenth century Tirthankara image and seventeenth century Tamil inscriptions
-do-	Konavattam	Siva temple and late Chola Tamil inscriptions, pillared *mandapa* of Nayaka period
-do-	Muthukumaranmalai	Megalithic stone circles
-do-	Odukathur	Hero-stones of Nayaka period
Vaniyampadi	Ambalur	Tamil inscriptions of Nayaka period

Taluk	*Village*	*Nature of remains*
-do-	Bomrnainayakanpalayam	Late medieval habitational site and hero-stone of Nayaka period
-do-	Kovilur	Siva Temple (Chola period) and Tamil inscriptions of Sambuvarayar period
-do-	Kovilanthangal	
-do-	Melsanankuppam	Tamil inscriptions of Nayaka period Inscribed
-do-	Minnur	hero-stones of late Pallava period Hero-stones
-do-	Vaniyambadi	(Nayaka period) Brahmanical sculptures of
-do-	Seenanthal	Chola period Vishnu temple (Vijayanagara
-do-	Vadakkupattu	period) Megalithic urn burials

80. EXPLORATION IN DISTRICT THANJAVUR.—The Excavation Branch of the Department 6f Archaeology, Government of Tamil Nadu, explored Sekkadimedu, a suburb of Thanjavur. From this site, some outstanding terracotta figurines datable to eighteenth century were collected.

81. EXPLORATION IN DISTRICT TRICHY.— The Excavation Branch of the Department of Archaeology, Government of Tamil Nadu, carrried out exploration at Aravakurichi which is situated in Karur taluk of the district. A terracotta mother goddess showing a child held on mother's hip was found. Stylistically, the figurine is assignable to later Chola period, i.e. thirteenth century AD.

UTTAR PRADESH

82. EXPLORATION IN THE GAGAS VALLEY, DISTRICT ALMORA.— In continuation of the earlier work the Regional Archaeological Unit, Almora, under the Uttar Pradesh State Archaeological Organization, resumed exploration in the Gagas valley. The Gagas is a tributary of the river Rama Ganga-west. The exploration was conducted by Krishan Kumar Singh of the Unit under the general direction of the Regional Archaeological Officer, Hem Raj. Remains of ancient temples and stone sculptures belonging to early medieval and medieval periods were brought to light at Reetha and Silora-Mahadev villages. Among important finds are, the image of the Buddha *(circa* twelfth century) at Reetha village (pl. XXXIA) and Parvati *(circa* tenth century) at Silora-Mahadev village; the other sculptures found are those of Uma-Mahesvara, Surva. Mahishasurarnardini, Lakulisa, etc.

83. EXPLORATION IN THE SOMESVARA VALLEY, DISTRICT ALMORA.—Under the scheme of valley-to-valley survey the Regional Archaeological Unit, Almora, under the Uttar Pradesh State Archaeo logical Organization, undertook exploration in the Somesvara valley. It was conducted by Krishan Kumar Singh of the Unit. An early medieval temple built in Nagara style alongwith a number of stone sculptures was discovered at Diyari village. The images of *makaravahini* Ganga, Surya, Uma-Mahesvara and Indrani are important finds. In the villages of Nakot and Kakrai, the medieval sculptures of seshasayi Vishnu, vinadhara-Siva, Karttikeya, Parvati, Saptamatrika panel and Ganesa were also brought to light during exploration in the valley.

84. EXPLORATION OF ANCIENT WOOD CARVINGS IN HAVELIS, DISTRICT ALMORA'.— The Regional Archaeological Unit, Almora, under the Uttar Pradesh State Archaeological Organization undertook exploration of ancient *havelis* containing wood-carvings in Almora city. The work was conducted by Hem Raj under the general guidance of Rakesh Tewari.

About two hundred *havelis* with wood-carvings situated in different *mohallas* of the Almora city were discovered during exploration. Most of the *havelis* are situated in the *mohallas* of Lala Bazar, Upreti-khola, Rajpura, Niyazganj, Mall-Danya, Dubkiya, Kunjpur, Kholta, Narsingbari, Thapalia, Gangola, Pokharkhali, etc. But Johri Bazar and Khajanchi *mohalla* are full of ancient *havelis,* which contain rich wood carvings. The wood-carvings were found in the form of windows, entrances, ceilings, and balconies etc. The subjects of wood-carvings include images of various gods and goddesses, lotus-flowers, creepers, animals, birds, flower-pots, etc. The house-entrances are richly decorated like a temple-entrance carved out of wood. It consists *tri-sakha* or *pancha-sakha* having pillar at the bottom, out of which are shown sprouting flowers, creepers, and other kind of *sakhas.* The images of gods and goddesses are carved on the lintel of the gate.

An ancient *haveli* having a number of wood-carvings was brought to light in Soopi village of tehsil Begeshwar in district Almora.

85. EXPLORATION IN DISTRICT BIJNOR.— In the course of exploration under village-to-village survey scheme, Narendra Kumar of the Agra Circle of the Survey brought to light the following sites:

Tehsil	*Village/Site*	*Nature of remains*
Chandpur	Athathza	Late medieval mosque
-do-	Adampur	Grey ware, medieval red ware
-do-	Buchanagla	Black and red ware
-do-	Chandpur	Medieval site
-do-	Khera	Medieval site
-do-	Kalyanpur	Medieval site

Tehsil	*Village/Site*	*Nature of remains*
-do-	Mayam pur Raja	Late medieval wall
-do-	Mainum Nagla	Medieval wall
-do-	Rehta Tagir	Black-slipped and red ware
-do-	Umrabuzurg	Medieval site

86. EXCAVATION AT ERICH, DISTRICT JHANSI.— The Lucknow Circle of the Survey under the direction of H.N. Singh, assisted by Arun Kumar, R.Pathak, Indu Prakash, S. B. Shukla,D. Goswami and K.M. Saxena, undertook excavation at Erich (Lat 25° 47'; Long 79° 7' E), a small town on the right bank of the river Betwa (ancient Vetravati) in Garautha tehsil. The site had been explored earlier by the Survey. Trial trench was laid on the Kila mound of the Erich town to ascertain the cultural sequence and connection if any with Suktimati, the ancient Chedi capital. A trench, measuring 5x5 metres, was taken on the southern slopes of the mound. At a depth of 5.60 metres a burnt brick structure of residential type, datable to Gupta period was found.

Another trench was taken on the western slopes of the mound facing the river. Here, hard, compact and blackish natural soil was reached at a depth of 9.60 metres. In all, 19 layers were identified which have yielded the following habitational levels of different periods ranging from pre-NBP at the earliest to fourteenth century AD at the top when the mosque was built on the mound.

The thickness of deposit of Period I ranges between 25 and 45 centimetres which overlies the natural soil. It is characterized by plain black-and-red and black-slipped wares and is devoid of iron or any other associated wares. Shapes in wheelmade pottery consist of bowls and dishes (incurved with its variants). No antiquity was reported from the regular layers but in a pit sealed by this habitational deposit yielded lumps of copper, a bone point and also a *ghata-shaped* terracotta bead.

Period II is characterized by the appearance of NBP ware. The thickness of the habitational deposit of the period is 2.60 metres. The NBP found is black as well steel grey in colour with its classical lustre and the usual types such as bowls and dishes and its variants. The associated wares are black-and-red, black-slipped and red wares as well as orange coloured ware. The frequency of black-and-red and the black-slipped ware was much higher in the lower levels and outnumbered the NBP. The minor antiquities included beads of terracotta, one six faceted biconical crystal bead, terracotta disc, bangle piece, pendant, hopscotch, stone ball, bone stylus, copper coin, ghata-shaped terracotta bead, glass bangle piece, terracotta mother goddess, skin rubber and numerous iron objects such as nails with square section, etc. Houses were built perhaps of bamboo, plastered with mud as attested to by the find of mud clods with reed impression. In upper levels, remains of burnt brick structures were found.

This period is marked by Kushana wares and typical pottery such as the inkpot, sprinkler, knife-edged bowls and carinated *handi* and other associated red wares with utilitarian shapes.

Evidence of structural activity was in the form of remains of a wall built of burnt bricks, which conform in measurement to the Kushana bricks. The thickness of the habitational deposit is 1^50 metre.

The most significant find from these levels was that of a terracotta seal having inscription in Brahmi characters of the Kushana period reading *'Samghasya'* suggesting the existence of a monastic establishment. The other antiquities included ivory bangle piece, a miniature terracotta bull figure, a bone stylus, copper antimony rod and iron objects.

Period IV could tentatively be assigned to the Gupta period. Of this period was a residential burnt brick structure and also some typical terracotta figurines. Other antiquities from this level are a copper coin, terracotta ear stud, *ghata-shaped* bead, pendant, ivory miniature vase, bone point, shell bangle, arecanut-shaped bead and numerous iron objects. Deposits of this period were much disturbed due to brick robbing and huge pits.

No clear cut division of habitation subsequent to the Gupta period could be worked out due to the mixed material. Medieval pottery comprised of a few glazed ware sherds at the top level. Tentatively, the whole deposit could be assumed to be early medieval and the structural activities on top of the mound taking place sometime during the Indo-Islamic period between the twelfth and fourteenth century AD.

The following tentative time bracket may be assigned to the different periods at the site

I.	Pre-NBP Period	-	Pre 600 BC
II.	NBP Period	-	600-200 BC
III.	Sunga-Kushana Period	-	200 BC-AD 300
IV.	Gupta Period	-	AD 300-600
V.	Early medieval Period	-	AD 600-1200
VI.	Indo-Islamic Period	-	Post AD 1200

87. EXPLORATION IN DISTRICT LALITPUR.— Ambika Prasad Singh, of the Regional Archaeological Unit, Jhansi, of the Uttar Pradesh State Archaeological Organisation, under the direction of Rakesh Tewari, undertook explorations in Bar region of the district.

During the course of exploration medieval temple remains were located at Gugarwara and Dhawari. *The jangha* portion of these temples was found in a dilapidated condition. Apart from these, temple remains like pillars, *rathika-bimba, amalaka,* etc., were also recovered at these sites. Siva *linga* is installed in the cella of Gugarwara temple, whereas the cella of Dhawari temple is without any image. Among the important images are those of Surya, Ravananugraha, Trivikrama-Vamana, Vishnu, Mahishasuramardini, Uma-Mahesvara, Seshasayi Vishnu and fragment of Tirthankara

image. Apart from these, many architectural remains and sculptures belonging to the Jaina sect datable to early medieval period were also noticed. list of sites discovered is given below:

District	*Village/Site*	*Nature of remains*
Lahtpur	Bar	Medieval temple remains and sculptures
-do-	Bachharavani	Medieval sculptures
-do-	Bhelonilodh	Medieval sculptures and temple remains
-do-	Bhelonisuba	Medieval sculptures
-do-	Bastguwan	Medieval sculptures
-do-	Banpur	Medieval temple remains, sculptures and remains of a fort
-do-	Bir	Medieval temple remains and sculptures
-do-	Barokhara	Medieval sculptures
-do-	Buragaon	Medieval temple remains and sculptures
-do-	Dasrara	Medieval temple remains and sculptures
-do-	Dhawari	Medieval temple remains and sculptures
-do-	Deoran	Medieval sculptures and eighteenth century Jaina temple
-do-	Gadyana	Remains of a *garhi,* eighteenth century Jaina temple
-do-	Gedoura	Remains of an eighteenth century temple
-do-	Gugarwara	Medieval temple remains and sculptures
-do-	Kailguwan	Remains of a fort
-do-	Khaira	Medieval sculptures
-do-	Kuwagaon	Medieval temple remains and sculptures
-do-	Larvari	Medieval sculptures
-do-	Paron	Eighteenth century Jaina temple
-do-	Tori	Medieval temple remains and sculptures

88. EXCAVATION AT MANIGARA, ADWA VALLEY, DISTRICT MIRZAPUR.—Located on the northern foot of Adhesar hillock in Adwa valley near the M.P. (district Rewa)-U.P. (district Mirzapur) border at a distance of about 70 km south of Mirzapur, the Acheulian site of Manigara (Lat 24°39 'N; Long 82° 19' E) was first discovered by the Department of Ancient History, Culture and Archaeology, University of Allahabad during the course of explorations. Bounded by Adhesara hillock and Chulhia *nala* in the south, village Manigara and Chugwa *nala* in the east, villages Murpeli and

Pokhara in the north and river Adwa in the south, it measures about 3-75 sq km (2-5 km from north to south and 1 -5 km from east to west). Several branches of the Jhadwa *nala* (a tributary of Adwa river) which flows through this site, dissect it into various sectors. The acheulian artifacts appear to be embedded in a gravelly dark brown clay matrix which is finally sealed by a red-yellow sandy loam, the last geological deposit formed in the Adwa valley. Where this sealing layer has been washed away the Acheulian artifacts comprising shaped, semi-shaped tools and fabrication debitage generally made on quartzite and occasionally on limestones and chert, have been exposed abundantly. The artifacts are generally found in clusters in the concentrations of sandstone rubbles of various shapes and sizes. Some of the rubble concentrations are characterized by big sandstone-boulders on their periphery. Big tabular sandstone or quartzite blocks lying almost in the centre of some of these circular rubble-concentration bear bruised surface and as such they appear to have been used as anvil-stones for manufacturing the artifacts. The Acheulian artifacts occur in three contexts, from factory site, from basal-bouldery gravel and from erosions of the Jhadwa *nala.* The artifacts from Gravel I which is generally exposed in the upper reaches of Jhadwa *nala* (in the eastern direction) are as fresh and as slightly abraded as those from workshop-site.

With a view to understanding the total thickness of the cultural debris and developmental trends of the Acheulian industry it was decided to conduct excavation at the site. For this purpose a place on the bank of Jhadwa *nala,* locally known as Patehar in the revenue village Manigara was selected on account of high concentration of artifacts and sand-stone rubbles on the surface.

The excavation was conducted by B .B. Misra and Kamalakar Thakur of the Department. First a 5m x 5m grid was laid immediately to the north of the gully running east to west. A s the excavation work proceeded it. became necessary to expand the main grid in the eastern side by an additional 10 metres to completely expose and delimit the cluster. Thus the main area of excavation consisted of a 7m x 5m grid which was laid out over an area where the greatest concentration of surface artifacts belonging to different stages of manufacture and rubbles were available. In order to determine the stratigraphic sequence and total thickness of the acheulian debris at the site and also for necessary stratigraphic control in the main grid-excavation, a l m x l m test trench was laid out at an elevated spot at the distance of 10m to the east of the main grid.

The surface topography of the area selected for excavation varies considerably. The greater elevations are found in the east and the north sides with a minimum depth in the south. Before the commencement of the excavation all the artifacts and the rubbles lying on the surface of the main grid were plotted and photographed.

Test Trench was dug first. Excavation in the test trench was conducted upto the bedrock, struck at the depth of 45 cm below surface. The uppermost layer at the site is a red-yellow sandy loam about 5 cm thick. This appears to be the remainder of a sandy loam, sealing the acheulian debris at the site. Beneath this level was found a 40 cm thick acheulian debris embedded in brown clay matrix with lateritic and iron/manganese inclusions. A few artifacts were found from this deposit (level 2). Noteworthy among them were two cleavers one from the upper and another from the bottom of level.

Excavation in all 25 squares of the main-grid was conducted simultaneously. Here the uppermost .level (1) encountered in the test-trench dig, was completely washed away. Excavations were conducted upto the bedrock. As the bedrock in this area was undulating precise thickness of the acheulian deposit could not be determined. Acheulian artefacts generally in mint condition along with manufacturing debris were found from this level (2). The general features (viz. clustering of artifacts and sandstone rubbles) noticed at the surface generally continued below almost upto the bed-rock. Thickness of the acheulian debris varied considerably. Maximum thickness was recorded in squares E3, E4, and E5 of the grid where the bed-rock has deepened considerably. Similarly concentrations of artifacts and rubbles also varied greatly in the main grid. Grid squares A1, B2, C1, C2, C3, Dl, D2, El, E3, E4, E5, F3, F4, Gl, G3 and G4 have a very high to moderate concentration of artifacts and rubbles while the remaining of the squares have only small quantity of debitage and very few artefacts. The distribution pattern of artefacts and rubbles is shown in the site-plans.

Excavations have yielded as many as two hundred thirty seven lithic artifacts. They may broadly be divided into two categories—(i) shaped/modified artefacts (123 Nos.: 51-9%) and (ii) unmodified wastes (114 Nos : 48-1%). Shaped tools comprise pebble-tools, various types of handaxes (pear-shaped, ovate, cordi-form, picks, chisel-ended, almond-shaped, sub-triangular, etc); cleavers (parallel-sided, divergent, convergent, splayed types); scrapers (side, end, convergent, round notched or hollow varieties), besides a few discoids, spheroid, backed knife and denticulates). Among the shaped tools cleavers, generally made on flakes are in majority. The ratio of cleavers to handaxe is about 2:1. Majority of the tools exhibit evolved traits-sharper edges, cortex completely removed, better workmanship, symmetry and shallow flake-scars etc. Unmodified waste consists of cores, flakes/flake fragments, chunks, etc.

Artifacts are made on quartzite and limestones/chert. However, quartzite is the most common raw material utilised for manufacturing the artefacts. It accounts roughly for more than 97%. It was locally available in the immediate vicinity of the sites in Adhesar hillock. Limestones and chert occur as erratics in tabular form. Chert and limestones seem to have their source in limestone formations in the adjacent Kaimur range. Limestone formation is exposed in the Kharbotia nala (a branch of Jhadwa). Evidence for the use of both the hard hammer (block on block or anvil) and soft hammer techniques are available. Hard hammer flaking seems to have been the dominant mode of flake detachment as is evident by the platform angles on most of the flakes which are well over 100 degrees. Low length to breadth ratios of flakes and prominent positive bulbs on them also lead to the same conclusion. For retouching purpose (secondary work) on the shaped tools, generally soft-hammer-technique was resorted to as is evident by the presence of shallow flake scars on most of the shaped tools.

Located in the intermediary area between the Belan and the Son valleys the acheulian assemblage from Manigara shares the characteristic features of the Lower Palaeolithic industries of

both the tracts and thus provides a link between them. A TL date of 103,800 BP has been obtained from a loessic deposit that overlies basal Gravel I (Shihwal formation) of the Son valley, incorporating Acheuliean artifacts. This TL date indicates clearly that Lower Palaeolithic Acheulian industries of the Vindhyan area are much older than 103,800 BP, a date which marks the transition from Lower Palaeolithic to Middle Palaeolithic in the region. This loessic deposit yielding the above TL date forms the base of another formation (Patpara formation) which incorporates Middle Palaeolithic artifacts. Thus this TL date provides the terminal date of Lower Palaeolithic in the region.

89. EXPLORATION IN DISTRICT NAINITAL.— In continuation of the previous work Krishan Kumar Singh of Regional Archaeological Unit of the Uttar Pradesh State Archaeological Organization, Almora, resumed village-to-village exploration in the vicinity of Pahar Pani and Bhawali. About 45 villages were surveyed during exploration, and four obelisks were located near Pahar Pani and medieval stone images of Lakshmi-narayana, Vishnu, Ganesa, Siva and Vaishnavi were noticed in a Siva temple at Naukuchiatal, Bhimeswara temple of Rawat village and modem temple of Damyantital.

90. EXPLORATION IN DISTRICT PAURI GARHWAL.—Under the direction of Rakesh Tewari, P.K. Singh assisted by B.P. Badoni and B.B.S. Rawat of the Regional Archaeological Hill Unit, Pauri Garhwal, of the Uttar Pradesh State Archaeological Organization, discovered the following sites in the course of exploration in district Pauri Garhwal:

District	*VillagelSite*	*Nature of remains*
Pauri Garhwal	Bada	Medieval sculptures
-do-	Kanda	Medieval sculptures
-do-	Kandi	Medieval sculptures
-do-	Kothar	Medieval sculptures, inscription
-do-	Kyark	Medieval sculptures
-do-	Kukhargaon	Medieval temple group and sculptures
-do-	Navoli	Medieval *naula*
-do-	Rampur	Medieval temple remains and sculptures
-do-	Sabdarkhal	Medieval temple

91. EXPLORATION IN DISTRICT PITHORAGARH.— A team of Regional Archaeological Unit, Almora, of the Uttar Pradesh State Archaeological Organization located a group of early medieval temples built *in pidha* style at Kotli village. The group of temples is locally known as Vishnu temple and there lie a number of stone images of Ganga, Yamuna, Karttikeya, Uma-Mahesvara, Varahavatara, Vishnu

and Mahishasurmardini datable between *circa* eighth century and twelfth century. In continuation of previous year's work Krishna Kumar Singh of the Regional Archaeological Unit, Almora, under the Uttar Pradesh State Archaeological Organization resumed village-to-village exploration in tehsil Champawat. About 47 villages were explored in the vicinity of Kimtoli and Pulhindola villages about 30 km away from Lohaghat. Archaeological remains were located in the villages of Basan, Patoli, Mazpeeple, Madlak, Baskuni and Mana. Early medieval temples built in *pidha* style were located in the villages of Mazpeeple, Madlak, Baskuni and Mana. A Nagara style temple of medieval period was found at Basan village. There is a sun temple at Mana village which is bearing a Brahmi inscription, datable to *circa* eighth century. The sun image, originally installed in the temple is lying in a modem temple of the village. Stone sculptures of Vishnu, Lakshmi-narayana, Parvati, Uma-Mahesvara, Karttikeya, Mahishasuramardini, Ganga, Lakulisa, Ganesa, etc., datable between eighth century and twelfth century AD were discovered at Chamdeval, Mana, Madlak, Mazpeeple and Khapar-Mahadeva temple at Patoli village.

92. EXPLORATION IN DISTRICT SONBHADRA.— Girish Chandra Singh, under the direction of Rakesh Tewari of the Uttar Pradesh State Archaeological Organization discovered the following sites:

District	*Village I Site*	*Nature of remains*
Sonbhadra	Amdih	Medieval Brahmanical sculptures and architectural fragments
-do-	Agandwa	Historical pottery and brick-bats; medieval Brahmanical sculptures
-do-	Amghat	Medieval Brahmanical sculptures
-do-	Baijnath	Historical pottery and brickbats, medieval Brahmanical sculptures
-do-	Bar	Medieval Brahmanical sculptures
-do-	Bardia	Medieval Brahmanical sculptures and architectural fragments
-do-	Bhagahi	Stone celt, medieval Brahmanical sculptures
-do-	Bhainsi	Historical pottery and medieval Brahmanical sculptures
-do-	Bisrekhi	Medieval Brahmanical sculptures
-do-	Devgarh Pahar	Microliths
-do-	Domani	Medieval Brahmanical sculptures
-do-	Dulhtha	Historical pottery and brickbats; medieval Brahmanical sculptures
-do-	Eklavyanagar	Medieval Brahmanical sculptures
-do-	Gaukunda	Historical pottery and brickbats, medieval Brahmanical sculptures

District	*Village!Site*	*Nature of remains*
Sonbhadra	Haramkhuri	Historical pottery and brickbats; medieval Brahmanical sculptures and ruined temple remains
-do-	Kandiya Tara	Medieval Brahmanical sculptures
-do-	Kandhara	Historical pottery and brickbats; medieval Brahmanical sculptures and ruined temple remains
-do-	Khajuri	Medieval Brahmanical sculptures and architectural remains
-do-	Lakshminia	Medieval Brahmanical sculptures
-do-	Mahadeva	Medieval Brahmanical sculptures
-do-	Mahanv	Historical pottery and brickbats; medieval Brahmanical sculptures and ruined temple remains
-do-	Majhigawa Mishr	Medieval Brahmanical sculptures
-do-	Mukha	Medieval Brahmanical sculptures
-do-	Rumma	Medieval Brahmanical sculptures
-do-	Satdwari	Historical pottery and brickbats; medieval Brahmanical sculptures
-do-	Shivdwar	Historical pottery and brickbats, fort, medieval Brahmanical and Jaina sculptures and architectural remains
-do-	Singhraha	Medieval Brahmanical sculptures

WEST BENGAL

93. EXPLORATION IN DISTRICT BANKURA.—In the course of village-to-village survey, T.J. Chakraborty of the Calcutta Circle of the Survey discovered the following sites of archaeological interest :

Police Station	*Village/Site*	*Nature of remains*
Kotulpur	Baitalkuh	Late medieval watch tower
-do-	Belpushkarini	Mound
-do-	Chamat	Stone sculpture
-do-	Chatrapara	Late medieval temple

Police Station	*Village/Site*	*Nature of remains*
-do-	Diachpri	Late medieval temple
-do-	Gourangapara	Late medieval temple
-do-	Raghunathpur	Late medieval temple
-do-	Srirampur	Late medieval temple

94. EXCAVATION AT MANGOLKOT, DISTRICT BURDWAN.—In continuation of the previous season's work *(1988-89,* pp. 90-91) the Department of Archaeology, University of Calcutta, resumed excavation at Mangolkot. The work was directed by Samir Kumar Mukherjee with the assistance of Amita Ray, Anil Chandra Pal, Asok Datta, Mallar Mitra, N.C. Das, B. Chatterjee and D.K. Chakravarty of the Department. The present season's excavation, besides imparting routine training to the final year students of archaeology of this Department, envisaged first, to study in more details the use of iron at the Chalcolithic phase; secondly, to trace out the relationship of the structural complex exposed at KX^2 and KX^3 with those remains noted earlier at IX^1 and IX^2; thirdly, to locate the deposits of the medieval period, the existence of which was hinted through earlier excavtions and fourthly, to expose homestead pattern of the Kushana and Gupta periods.

In order to achieve the desired objectives, four trenches, measuring 6 x 6 m, were laid out on the western and north-western slopes of the main mound, locally known as Vikramadityer Danga ($MGKT^1$). Another trench, measuring 6x6 m was laid out at $MGKT^2$, which was adjacent to the local Madrasa (school).

As in the previous season, this year too the trenches revealed a succession of occupational periods ranging in date from the Chalcolithic to the late medieval times. Period I (Chalcolithic, *circa* 1200 BC - 600 BC) as noted in the previous year, the earliest habitation revealed at this site is characterized by the occurrence of black and red, black-slipped, red-slipped, lustrous red, black and grey, buff and cream-slipped wares. The principal pottery types in the black and red ware consist of bowls, vases, jars, channel-spouted bowls, dish-on-stand, *handis.* Three mud floors with post-hole marks were observed in this level. The floors are made of rammed earth with lime, cowdung and potsherds. Further evidences of reed marks in burnt clay lump were found in the debris. That cultivation of rice was practiced is evident from the remains of rice husk in pottery. Bones of humped Indian cattle, sheep, goat, antelope tortoise were found in plenty. Other finds that deserve mention include copper objects like stylus, fish-hook and some bone tools and comb, stone beads, balls, terracotta beads, net-sinkers, etc. Iron in the form of slags, ingot and tool-like broken portion of an arrowhead were recovered almost at the bottom of this level. The most important discovery of this season's excavation were the highly fragmented skeletal remains along with heaps of black and red

ware of various sizes, a few beads and iron objects, probably used as 'grave furniture', found embedded in a floor in the east-west direction.

Period II (Transitional, *circa* 6(X)-300 BC) at this site, like the previous year, yielded lesser number of black-slipped ware along with some new ceramics. The dominant ceramic industry of this phase is represented by plain red, brown and grey, black-slipped and buff wares. The important finds of this period consisted of profuse iron objects including spearhead, sickle(?), terracotta female figure and a few beads of terracotta.

Period III (Maurya and Sunga periods, *circa* 300 BC to the close of the first century BC) was marked by total absence of black and red ware though black-slipped ware continued in appreciable number. Other notable ceramics include coarse variety of NBP, red-slipped, grey and black-slipped wares with incised patterns. The principal shapes are bowls, dishes, basins and vases. Among the assemblage, an interesting type of pottery represents a bowl type of object either of grey or black polished sherds with straight edges. The shallow dishes made in black slip are found with flower motifs at the centre (pl. XXXI B). The important finds in this period consist of a small sized terracotta female head with an elaborate headdress bearing unmistakable resemblance to the typical Mauryan head of the Patna style (pl. XXXI C), beads of semi-precious stones like crystal, camelian, glass, jasper, agate, onyx, terracotta beads, bangles, cast copper coins of both circular and square varieties. The .structural remains comprised of mud houses with potsherd and lime-rammed floorings.

Period IV (Kushana, *circa* AD 100-300). This period was characterized by the total absence of the NBP or associated wares, the dominant ceramic industry being the sturdy red ware which is represented by shapes as bowls, dishes, vases, sprinklers, lids, long necked *surahi,* etc. Some of the pottery was decorated with stamped and incised designs. In general, the types of the above ceramics bear striking resemblance to similar finds from other Kushana levels of northern India. The period further revealed remains of structural activities in well burnt bricks, the sizes of the bricks used being 26 x 24 x 6m and 38 x 28 x 5 cm on an average. In the trench JY^{10} portion of a room complex with well laid *surkhi* rammed with brick soling floor and attached bricklined courtyard was exposed. The notable finds that deserve mention include beads of semi-precious stones like camelian, agate, jasper, glass and crystal, seals and sealings bearing various motifs, stone pestle, flesh-rubber, antimony rods, copper bowls and needles.

Period V (Gupta, *circa* AD 400-600) coeval with Gupta period, like the preceding phase, this period was marked by more structural activities. The main ceramic industry during the period was characterized by a rich repertoire of red ware with thin fabric, cream ware with slip and wash, grey ware at times with incised designs, representing bowls, dishes, vases, basins, vessels, etc. The structures of this period were made of well-burnt bricks of different sizes (18 x 24 x 8cm;24x 26 x 6 cm; 35 x 25 x 5 cm). The bricks were found to have been laid in clay mortar on the foundation of brickbats and *kankar.* The floor, as the evidence suggests, is made of rammed mud, lime and broken potsherds. A noteworthy feature of this phase was the discovery of three huge thick storage

jars for storage of either food grains or water, affixed to the house floor in Trench No. KX^2. The most remarkable find of this period consisted of an oval terracotta seal having a size of 5.5 x 5 cm found in a pit in $MGKT^2$ pl. XXXI D). It depicts a couchant bull on the top below which runs two lines of mostly effaced inscription in Brahmi characters of *circa* fourth-fifth century AD. Another seal having a size of 4 x 2t£ cm depicts *'stupa dhvaja'* symbol (pl. XXXI E). Other objects include beads of semi-precious stones, copper and iron objects of utilitarian use.

Period VI (Early and late medieval period). The cultural deposit of the period is disturbed but shows some structural remains made of bricks of varying sizes. The levels in general witness an overall decadence of material cultural ramains. Further evidence of extensive brick robbing in the area was also noticed. As a result, details of house plans could not be ascertained. Some structural ramains gave indications of the use of well burnt bricks of the earlier periods. The pottery of this period was primarily plain and simple unslipped red, black and grey wares. Carinated vessels, dishes, wide-mouthed heavy-rimmed jars, vases, saucers and globular jars are the principal pottery shapes. The finds in the upper level in general bear striking similarities with the finds of the Kachhandanga site excavated by this Department in 1988-89 season. The level further yielded remains of three fragmentary skeletons lying in north-south orientation. The general character of the skeletal remains and the associated ceramic assemblages leave no room for doubt that the spot in particular was used in later period as a burial ground.

95. EXPLORATION IN DISTRICT MALDA.—Gautam Sengupta of the Department of Archaeology, West Bengal, surveyed the early medieval mounds comprising of one central, big mound and several small mounds at Tulabhita village in Monza Jagajibbanpur, P.S. Habibp.ur. One bronze Buddha sculpture in *bhumisparsa-mudra* recovered from this site is now kept in the Malda museum.

96. EXPLORATION IN DISTRICT MIDNAPORE.—In the course of village-to-village survey work, Santanu Maiti of the Calcutta Circle of the Survey located the following sites of archaeological interest:

Police Station	*Village!Site*	*Nature of remains*
Egra	Basudebpur	Late medieval temples
-do-	Chirulia	Late medieval *atchala* twin Siva temples
-do-	Dulapur	Flat-roofed square temple

97. EXPLORATION IN DISTRICT PURULIA.—S. De of the Directorate of Archaeology, West bengal, carried out exploratory survey in the northern extremity of Purulia district, right from the source of the Kansai, with the assistance of D. Roy, P. Sen, B. Samanta, G. Chakraborty, M. Bhowmick and R. De.

The chain of hills bordering the district on its north and north-west extremities goes towards Ranchi-Hazaribag, Bihar. Actually, the western part of West Bengal shows the eastern edge of the pre-Cambrian shield with stable cratonic mass of archaean proterozoic rocks which is the eastern continuity of the Chhotonagpur plateau. The geological history of this area from Pre-Cambrian to Quaternary is seen recorded in the geostratigraphy being denuded by fluvial dentritic drainage in the form of gullies and ravines. Later on these have dissected deeply the tableland lying horizontally and bordering the shelf. This tableland overlooks the low-lying fills stretching to the east and is underlain by Pleistocene lateritized boulder conglomerate.

The aforesaid geological background was ideal for searching prehistoric habitation and hills on the north-west of Purulia district were surveyed. Two caves were found, one in the hill locally known as Belamu with the village name wherefrom they unearthed an elongated iron spearhead and other in the Jabarbon hill at a height of 100 m approximately, having three entrances, eastern, western and southern. The surface deposit inside the cave is about 0.87 m below from the roof of the cave. The maximum inside length of the Jabarbon cave is 11.1 m (east-west). The width of the three entrances is 3.05 m (eastern), 2-3 m (western) and 2-85 m (southern) respectively. Three cuttings were made inside this cave to understand the stratigraphy of the deposits. The first cutting was in the middle portion of the cave just in front of the southern entrance. This was dug upto a depth of 0.32 m. In the deposit comprising yellowish grey medium compact earth, no artifact was found. The second cutting was made in front of the eastern entrance. At a depth of 0.34 m a thin layer of 0.05 m lateritic soil with pellets was noticed. Below this layer, an underlain floor consisting of well-shaped and well-arranged rock fragments of quartz were noticed. Similar cutting made on the western entrance yielded some pottery fragments of grey ware and a bone piece with traces of working at a depth of 0-22 m of yellowish grey earth.

At Belamu (86°2' 46"; 23°7'25") in a cave showing traces of habitation inside the foothill, occurrence of Middle Palaeolithic tools, handaxes, points, etc., was noticed in the foothill area.

Form Khataga (85°3^f 43"; 23°27' 20"), Upper palaeolithic and mesolithic tools were found. Worth mentioning is an engraving on a free standing huge boulder of granitic gneiss which shows four figures standing in a row.

At Sulung Lahar (86°4' 38"; 23°28' 6") mesolithic and neolithic tools were recovered. At

Chitmu (86°4' 32"; 23°28' 6") a mesolithic site has been discovered.

From Korcha (86°2" 34"; 23°28" 6"), Masjor (86°5' 33"; 23°28' 22") and Pargo (86°4' 38"; 23°26' 37") palaeolithic implements like chopping tools and crude handaxes were found-.

H. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS[1]

ANDHRA PRADESH

1. INSCRIPTION OF KANDURI CHIEF, KOPPOLE, DISTRICT NALGONDA.—This inscription, engraved on a slab lying near a tank opposite the Mutyalama temple, is in Telugu language and characters and is dated in the Chalukya Vikrama era (year not specified) Angirasa (AD 1092-93). It registers a gift of land in the village Jalapattu for the upkeep of the lake at Kroproli and for the maintenance of the Rudresvaradevara-satra, on the occasion of *Uttarayan-sankranti,* by Kanduri-Tondaya-Chola-maharaju. The gift was entrusted to Chilyakamti-Anamtasaka-pandita.

2. KAKATIYA INSCRIPTION, MEDAVARAM, DISTRICT NALGONDA.— This inscription, engraved on a slab set up in a field outside the village, is in Telugu language and characters and belongs to the reign of Kakatiya Rudradeva-maharaju. Dated in Saka 1226, Krodhi (AD 1304), it registers a grant of land for the *ranga-bhoga* of the deity Svayambhu-Somanathadeva of Medavaram by *mummadi* Devaraju belonging to Karikala-vamsa, Kasyapa-gorra and Malav-aravaya. The gift was made for the welfare of *mahasamanta* Immadi Bolaya-reddi. of the Cheraku family (pl. XXXII A).

3. KAKATIYA INSCRIPTION, PALIVELA, DISTRICT NALGONDA.—This inscription, engraved on a slab lying in front of the Chennakesava temple, is in Telugu language and characters and belongs to the reign of Kakatiya Pratapa-rudradeva-maharaja (pl. XXXII B-C). Dated in Saka 1226, Krodhi (AD 1304), it registers a grant of land as the *vritti* of Chennakesava-perumal of Palavera, along with income from taxes from these lands, as *sarvamanya,* by Chakragala Vallabhaya-lemka, the *srivaishnavas* of the eighteen countries and the *ubhayananadesi-pekkamdu.*

GUJARAT

4. PEDESTAL INSCRIPTIONS, L.D. INSTITUTE, AHMEDABAD, DISTRICT AHMEDABAD.— Three in scriptions engraved on the pedestals of three marble images are in Sanskrit language and Nagari characters. Dated in Vikrama 1285 (AD 1228), these inscriptions record that the images of Maharaja Jayasimghadeva, Sriyadevi and Jasadevi, were caused to be made by Tha ° Vilhana$_t$ In view of the proximity of the known date of Jayasimha Siddharaja of the Vaghela family and Jayasimghadeva of the present epigraph, the images in question may be identified as those of that ruler and his queens.

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[1]Information from: 1-8 and 11-16, K.V. Ramesh assisted by Madhav N. Katti, M.D. Sampath, S.P. Tewari, S.S. Iyer, D.M. Nagaraju, T.S. Ravishankar, S.Swaminathan, A. Ramulu and S. Rajavelu of the Epigraphy Branch of the Survey; and 9-10, Hyderabad Circle of the Survey.

5. STONE INSCRIPTION, AHMEDABAD, DISTRICT AHMEDABAD.— This inscription engraved on a slab kept in the L.D. Institute Museum is in Sanskrit language and Nagari characters of about the twelfth century AD. It gives the genealogy of the Pragvata family and mentions Yasodeva, Mahadeva, etc. This stone inscription states that the eulogy was composed by the royal poet (name lost), son of Malladeva and engraved by *Sutra* Haripala.

KARNATAKA

6. KALYANA CHALUKYA INSCRIPTION, BANAHALLI, DISTRICT BIDAR.— This inscription, engraved on a slab set up in the Ramlingesvara temple in the village, is in Kannada language and characters. It belongs to the reign of Chalukya Bhulokamalla (Somesvara III) and is dated in his 4th regnal year, Saumya (AD 1129).. It refers to the genealogy of a chief (name lost) belonging to the lineage of Banaraja, the *mahamandalesvara* of Khandavamandala and to god Bibbesvara.

7. KALYANA CHALOKYA INSCRIPTION, MARKHAL, DISTRICT BIDAR. — This inscription (pl. XXXIIIA) engraved on a slab set up in front of the Hanuman temple in the village is in Kannada language and characters. It belongs to the reign of Chalukya Tribhuvanamalla (Vikramaditya VI) and is dated Chalukya Vikrama year 3, Vikrama (= D 1078). It refers to *mahamandalesvara* Gonkarasa of Khandava-mandala as belonging to the family of the Banas and describes the greatness of Hejja, probably a local chieftain.

8. ASOKAN EDICTS, SANNATHI, DISTRICT GULBARGA.— Four edicts, engraved on two sides of a slab used for installing the Kalikamba image in the Chandralamba temple, are in Prakrit language and Brahmi characters of the third century BC. One side contains portions of the XII and XIV Rock Edicts of this emperor. The diction and orthography closely follow the Erragudi version. The other side contains portions of the texts of separate rock-edicts already known from Jaugad and Dhauli. This is the third version since it somewhat differs from the other two in diction, orthography and grammar. Of these two separate edicts (pl. XXXIII B), edict I contains instructions to judicial officers and edict II is meant to give assurance to the border people.

9. LABEL INSCRIPTION, SANNATHI, DISTRICT GULBARGA.— A label inscription in Brahmi char acters was noticed on the limestone pillar of a Vihara which refers to a son of minister who performed *yajnas* and is dated to first-second century AD.

10. SATAVAHANA INSCRIPTION, SANNATHI, DISTRICT GULBARGA. — This inscription in two lines on a sculptured panel fragment of a memorial stone *{chhaya-sila)* in limestone, datable to first-second century AD, records the eulogies, conquests and victories of a king named Satakarni. The fragmentary panel denotes a memorial stone *(chhaya-sila).*

MAHARASHTRA

11. Two PEDESTAL INSCRIPTIONS, UDGIR, DISTRICT LATUR.— The first inscription, engraved on the pedestal of the image of Chahdraprabha, is in corrupt Sanskrit language and Nagari characters. Dated Vikrama 1548 (AD 1491)), it refers to the obeisance of *bhattaraka* Sri Jinachandra *of Mula-sangha* and that of Javaraja. The second inscription, engraved on the pedestal of the image of Parsvanatha kept in the mandir, is in local dialect and Nagari characters and is dated Vikrama 1581 (AD 1524). After mentioning the pedigree of the preceptors of the *Mula-sangha,* Sarasvati-*gachchha,* Balatkara-gona and Kundakund-anvaya, the epigraph refers to the making of the image.

TAMILNADU

12. VIJAYANAGARA INSCRIPTION, KANCHIPURAM, DISTRICT CHENGAI ANNA (FORMERLY CHINGLEPUT).— This inscription, engraved on the *adhishthana* of the Sabhanayaka shrine in the. Ekambaranatha temple, is in Tamil language and characters. It is dated Saka 1496 (AD 1574) and belongs to the reign of the Vijayanagara ruler Virapratapa Srirangayyadeva-maharaja (Sriranga I). It records the gift of the village Kadambur-Urattur for the purpose of the expenses of various festivals, daily worship and offerings to the deity Tiruvekambam-udaiya-nayinar of Kanchipuram by Tikkama-nayakkar, son of Tippu-nayakkar of Velur. The *mahajanas* of the gifted village undertook to supply ghee for the bathing ceremony of the deity on the Tiruvadirai day, in the newly constructed *mandapa* near the main stone-temple. The gift is stated to have been made for the merit of Nagama-nayakkar, the elder brother of the donor.

13. Two PANDYA INSCRIPTIONS, MELNETTUR, DISTRICT *P*ASUMPON TEVAR TKUMAGAN (FORMERLY RAMNED). — Of the two inscriptions, in Tamil language and characters, the first one is engraved on the south and east walls of the central shrine of the Tiravalangadu-udaiya-nayanar temple. It is dated in the fourth year (AD 1219-20) of the reign of the Pandya king Maravarman Sundara-Pandya I (pl. XXXIV A-C). It registers the royal gift of land at Kannanur in Melamangala-nadu owned by Nakkan Keralan *alias* Kangeyarayar as *devadana - iraiyili,* after exempting the taxes such as *antarayam, viniyogam, vettipattam,* etc., from his fifth regnal year, for providing food offerings and worship to the deity of Tiruvalngadu-udaiya-nayanar at Meinettur in Karungudi-nadu on the occasion of the king's natar star Avittam, in the month of Avani. It also states that Malavarayar, on the orders of the king, issued orders for the collection of fifty *kasu* as tax, instead of the previous taxes. A number of persons figure as signatories to the above order.

The second one, engraved on the south wall *of the ardha-mandapa* of the above temple, is dated in the third year of the reign of the Pandya king Sadaiyavarman Kulasekhara. It registers-fee grant of *Wrdramma* for the *sandhya* lamp to the deity Tiravalangadu-udaiya-nayanar in Karangudi-riadu by Araiyan Marudavanam-udaiyan *alias* Vilupparaiyan of the above *nadu.*

The *tiruvunnaligaiyar* of the temple are stated to have received the gift and undertaken to maintain the lamp perpetually.

14. TWO KONGU-CHOLA INSCRIPTIONS, ERODE, DISTRICT PERIYAR.—– Of the two inscriptions in Tamil language and characters of about the thirteenth century AD, the first one, brought from the village Ammapettai in Bhavani taluk, is now preserved in the Government Museum, Erode. It is dated in the 55th year of the reign of the Kongu king Kulottunga and records the gift of a tank and excavation of a channel by Semba-vettuvan Tondaiyan-Pillai *alias* Jayangondasola-Kongalvan of Kulavarrur in Vadakarai-nadu.

The second inscription brought from the Koduveri village in Gobichchettipalayam taluk, is now preserved in the same museum. It is stated in the 4+6 year (AD 1217) of the reign of the Kongu Chola king Virarajendra. It records the gift of two *palanchalagai-achchu* for maintaining two twilight lamps to the deity Tirumunnai-aludaiyar of Koduveli by Sattanchetti *alias* Padinen-vishayach-chakravarti of Sattimangalam in Kilpa-nadu.

15. PANDYA INSCRIPTION, SAYALKUOI, DISTRICT RAMANATHAPURAM.—This inscription (pl. XXXIV D), engraved on the tier of the *ardha-mandapa* of the Kailasanathasvami temple, is in Tamil language and Vatteluttu characters of about the tenth century AD. It is dated in the 2+10 year of the reign of the Pandya king Sadaiyan Maran. It registers the gift of fifteen sheep for the perpetual lamp to the deity of Sagiilkudi, a *brahmadeya* of Olokachintamanipperaraiyan-bhataran, son of the *kon* of Manimangalam, is stated to have instituted the gift for the merit of Araiyan Ilaiya-bhataran.

UTTAR PRADESH

16. SANSKRIT INSCRIPTION, RISHIKESH, DISTRICT PAURI-GARHWAL.— This inscription, engraved on a rock in Svargasram area, is in Sanskrit language and late Brahmi characters of the sixth-seventh century AD. It records the pious deed of one *sutradhara* Sudeva, a resident of Sri Siddhesvara at this place, in the vicinity of the new temple *(nava-devakula).*

ARABIC AND PERSIAN INSCRIPTIONS[1]

BIHAR

1. PERSIAN EPITAPH, AMJHAR SHARIF, DISTRICT AURANGABAD.— The epitaph records the death of Sayyid Shah Abu'l-Ma'ali *alias* Shah Bhikh in AH 1091 (AD 1681).

[1]information from : M.F. Khan, assisted by S.S. Hussain, M.Y. Quddusi, M.I. Quddusi, G.S. Khwaja and M.A. Siddiqui of the Epigraphy Branch of the Survey, Nagpur.

2. EPITAPH, KOATH, DISTRICT ROHTAS.—An epitaph, composed by Ahsan, registers the demise of Sayyid Nurul Hasan Khan Husaini Wasti Bilgrami in AH 1209 (AD 1794).

KARNATAKA

3. MISCELLANEOUS INSCRIPTIONS, KOLAR, DISTRICT KOLAR.— Of the four inscriptions, three copied from Kolar and one from Mulbagal, the first inscription refers to the construction of an auspicious *sara* (i.e. inn) by Muhammad Uthman in AH 1200 (AD 1785-86).

The second inscription records the construction of a *sara' i* for public utility by Ishaq in AH 1216 (AD 1801-02).

The third inscription records the demise of Muhammad Ishaq in AH 1220 (AD 1805-06).

According to the fourth epigraph Ishaq, who has been referred to above, had constructed one more *sara'i* named *Sara'i Haidari* in AH 1220 (AD 1805-06) before his death.

4. MISCELLANEOUS INSCRIPTION, HANAMSAGAR, DISTRICT RAICHUR.— This metrical Persian inscription records the demise of Shah Abul Hasan, a saintly person, in AH 1234 (AD 1818-19) and that the erection of his tomb *(rauda)* adorned this place,

5. INSCRIPTION OF THE MUGHALS, KUKNUR, DISTRICT RAICHUR.— This Persian inscription, executed in beautiful Nasta'liq characters, states that Sher Khan, the *faujdar* of Kadak i.e. Gadak, and his brother' Abdur Rasul built an auspicious mosque during the reign of (Aurangzeb)' Alamgir in his fortieth regnal year corresponding to AH 1108 (AD 1696).

6. EPITAPH, SIRA, DISTRICT TUMKUR.— The epitaph records the demise of Sayyid 'Umar son of Muhammad Ilahdad, probably a man of high lineage, in AH 904 (AD 1499).

7. MISCELLANEOUS INSCRIPTION, SIRA, DISTRICT TUMKUR.—The epigraph assigns the construction of the auspicious mosque to Shaikh Farid in the year AH 1108 (AD 1696-97).

MADHYA PRADESH

8. INSCRIPTION OF THE SULTANS OF MALWA, CHANDERI, DISTRICT GUNA.— Belonging to Sultan Ghiyathu'd-Din Khaiji of Malwa, a damaged inscription (pl. XXXV A), executed in Thulth and Naskh characters, records the demise of Malik-i-Mulukish Sharq Malik 'Alau'l Mulk son of Ahmad, *Wazir-i-Kabir* (great minister).

9. MISCELLANEOUS INSCRIPTION, CHANDERI, DISTRICT GUNA.— This partly effaced inscription engraved on a loose sarcophagus states that Malik Hamza Beg died in AH 895 (AD 1409); It appears that the deceased may have held some important position under the Sultans of Malwa.

10. INSCRIPTION OF THE MUGHALS, CHANDERI, DISTRICT GUNA. — The inscription, fixed on the entrance of the tomb, records that during the reign of Muhiyu'd-Din Badshah (i.e. Aurangzeb) one Hamidu'd-Din, a saintly person, built his tomb in his life time in AH 1094 (AD 1682-83).

11. INSCRIPTION OF THE MUGHALS, KUTWAR, DISTRICT MORENA.— This damaged inscription is the only record of the Mughal emperor Humayun so far found here which records the construction of a mosque in AH 937 (1531 AD) by some one whose name is not mentioned.

12. INSCRIPTION OF THE SINDHIYAS, KARAHAL, DISTRICT MORENA.— This bilingual inscription states that repairs of the well inside the *Garhi* (i.e. fort) was carried out by Srimant Raja Krishn in the time of Maharaja Bahadur Jhankoji Rao Sindhiya in AH 1252 (AD 1836). It also mentions the names of the officials and artisans, Babu Rao Jiu, Bahadur Khan Jama' dar Sitaram, who were instrumental in this work.

MAHARASHTRA

13. MISCELLANEOUS INSCRIPTION, ASHTI, DISTRICT BEED.— Dated in Fasli year 1182 (AD 1772) this Persian inscription records the construction of the tomb of Shah Fattah Bukhari by Shah 'Inayat.

14. BAHMANI INSCRIPTION, CHANGAD, DISTRICT KOLHAPUR.—An interesting epigraph of the time of 'Adil Khan Ghazi records the construction, obviously of a mosque, in AH 907 (AD 1501 -02) and contains name of Abul Muzaffar Mahmud Shah Bahmani. It may not be out of place to mention here that 'Adil Khan Ghazi who was the governor of Bijapur under Bahmanis, having declared his independence, founded the 'Adil Shahi dynasty in AD 1490. The epigraph speaks that although he had become an independent ruler of Bijapur, he recognised the overlordship of Sultan Mahmud Shah Bahmani.

15. INSCRIPTION OF 'ADIL SHAH, MALE, DISTRICT KOLHAPUR.— The epigraph, in Naskh characters, records the construction of a mosque by 'Abdul Latif son of Shaikh Muhammad.

16. MISCELLANEOUS INSCRIPTIONS, PANHALA, DISTRICT KOLHAPUR.— The inscription, lying loose near the tomb of Hadrat Sa'dud-Din, records the demise of Haji Mannan, probably a pious and religious person, in AH 920 (AD 1514).

17. INSCRIPTIONS OF GOND RAJAS OF DEOGARH, NAGPUR, DISTRICT NAGPUR.— Of the two inscriptions found in the graveyard of the Gond Rajas in A'zam Shah layout Colony, the first records the death of Raja Burhan Shah in AD 1796. The other inscription records the demise of Raja Rahman Shah but the date of his death is not mentioned. The other inscription belonging to the same family is fixed on the gate of the fort. It states that *the Naqqar Khana* (drum-house) alongwith a lofty gate was constructed by Raja Sulaiman Shah at the instance of Hasan Khan in AH 1292, Fasli year 1282

(AD 1874). It also provides information that seven, thousand, two hundred and fifteen rupees were spent on it and it took four months for completion of this work.

18. MISCELLANEOUS INSCRIPTION, SUPA, DISTRICT PUNE.—This epigraph states that the tomb of Mansur 'Arif was built with the effort of Latif Shah, one of the descendants of the saint, in AH 1108 (AD 1696-97).

ORISSA

19. MISCELLANEOUS INSCRIPTION, SEMALPADA- DISTRICT CUTTACK.—A metrical Persian inscription, composed by Hasan 'Ali, records the construction of a mosque by Maqsud Ufaqi in the Fasli year 1248 i.e. AH 1258 (AD 1842-43).

20. MUGHAL INSCRIPTION, NARSINGHPUR-PIPU, DISTRICT PURL— Belonging to Aurangzeb, this Persian inscription, in Nasta'liq characters, records the construction of a mosque by 'Abdul 'Aziz, son of 'Abdul Karim, son of Mirza Ansari in AH 1085 (AD 1674).

21. INSCRIPTION OF THE MUGHALS, PIPLL, DISTRICT PURL— The inscription, in possession of Fida Husain but originally belonging to the tomb of Hadrat Sayyid Sultan, states that in the sixteenth regnal year (i.e. AH 1147 = AD 1734) of the Mughal emperor Muhammad Shah, when Nawwab Muhammad Taqi Khan was the Subedar, this noble edifice obviously the tomb, was constructed under the supervision of Shaikh Fathullah son of Shaikh Fasihullah, the resident of *qasba* Unam (i.e. Unnao) in the *sarkar* Lucknow of the province *(Suba)* of Awadh.

UTTAR PRADESH

22. INSCRIPTIONS OF THE MUGHALS, SAUMPUR, DISTRICT DEORIA.—This metrical record of Shah Jahan in Persian, executed in beautiful Nasta'liq characters, records the construction of the mosque along with the well by Khuda Quli in AH 1065 (AD 1654-55),

23. MISCELLANEOUS INSCRIPTION, FATEHMJR, DISTRICT FATEHPUR.— The epigraph records the construction of a mosque by Husain Bakhsh Khan in AH 1195 (AD 1780-81).

24. MISCELLANEOUS INSCRIPTIONS, HASWA, DISTRICT FATEHPUR.— This Arabic inscription, executed in Naskh characters, records the construction of the mosque by 'Abdul Hadi in AH 940 (AD 1533,-34). The other inscription in Persian states that the mosque which had been built earlier, in AH 650(AD 1252-53) was rebuilt on the same foundation in the year AH 1359 (AD 1940-41). One more inscription, also from the same place, assigns the construction of a mosque to Siddiq Ahmad in AH 129,4 (AD 1877-78).

25. MISCELLANEOUS INSCRIPTION, KALPI, DISTRICT JALAUN.—The epigraph assigns the construc tion of the *ka'ba-* like mosque to Afdal Muhammad in AH 1261 (AD 1845)

26. INSCRIPTION OF THE MUGHALS, DERAPUR, DISTRICT KANPUR.— Dated in the first regnal year (of Ahmad Shah) in AH 1161 (AD 1784/) the epigraph states that the mosque was built by ' Azmat Khan.

27. MISCELLANEOUS INSCRHTION, DERAPUR, DISTRICT KANPUR.— This inscription records the construction of a mosque by Mir Aman Ali in AH 1253 (AD 1837-38).

WEST BENGAL

28. INSCRIPTION OF THE MUGHALS, DISTRICT MURSHIDABAD.— This interesting inscription belonging to Shah Jahan, engraved on *a palki* (palanquin) made of ivory, contains the date AH 1050 (AD 1640-41) and the place-name Delhi which indicates that the *palki* was in the personal use of the said emperor.

29. PERSIAN INSCRIPTION, DISTRICT MURSHIDABAD.— This Persian inscription on another *palki* reads : *Sarkar Zaibun Nisa Begam* and records the date AH 1089 (AD 1678-79) which indicates the fact that the *palki* belonged to Zaibun Nisa, the daughter of Aurangzeb.

30. MISCELLANEOUS INSCRIPTIONS, DISTRICT MURSHIDABAD.—The epigraph records the demise of Manuchihr Khan, a pious and religious person, in the year AH 1152 (AD 1739-40). Another Arabic inscription registers the death of Muhammad Hadi, son of Mirza Abu Turab al'alawi al -'Aqili, popularly known as Hakim Sayyid Muhammad Hadi Khanbu, is AH 1174 (AD 1760). According to one more Arabic inscription from the same place, Hakim Sayyid Muhammad Husain, son of Muhammad Hadi mentioned above died in AH 1203 (AD 1788).

31. PERSIAN INSCRIPTION, DISTRICT MURSHIDABAD.— A beautiful Persian inscription records the death of Mir 'Ali Naqi in AH 1207 (AD 1792-93). Another inscription states that a generous lady of high lineage, named Badrun-Nisa Begam, built this beautiful mosque in AH 1259 (AD 1843-44).

32. INSCRIPTIONS OF THE SULTANS OF BENGAL, QASBA MAHSO, DISTRICT WEST DINAJPU'R.— This Arabic inscription (pl. XXXV B), executed in Naskh in Tughra style, records the construction of a mosque during the reign of Abul Muzaffar Husain Shah by Rukn Khan (son of) 'Alauddin, a man of high dignity, in AH 906 (AD 1500-01).

33. PERSIAN EPITAPH, QASBA MAILSO, DISTRICT WEST DINAJPUR.— This badly damaged epitaph records the death of Taqiul Miliat Shaikh Sulaiman. Unfortunately the date portion is lost.

III. NUMISMATICS AND TREASURE TROVE[1]

ANDHRA PRADESH

1. IKSHVAKU AND SATAVAHANA COINS, AMARAVATI, DISTRICT GUNTUR.— Lead coins of the Ikshvakus and lead and copper alloy coins of the Satavahanas datable to second-third century AD were recovered during debris clearance work around Maha-Stupa.

GUJARAT

2. SILVER COINS, TAJPUR, DISTRICT BHAVNAGAR.— Four hundred seventy three silver coins were found from the foundation of a house in Tajpur in Botad taluk. The weight of these coins is 5 kg and 331 grains. The coins (pl. XXXVI A) are of Mughal emperors Muhammad Shah (AD 1719 to 1748), Farukhasiyar and Shahjahan II; most of these were minted at Ahmedabad and Surat. On the obverse of these coins occurs the name of the king and the title "Badshah Ghazi", and oh the reverse the date and the name of mint is given. Some coins bear the *Kalima*.

3. COINS, AMTHOLI, DISTRICT SURAT.—Out of the nine coins found from taluk Choriyasi, one is a Gadhaiya coin found from railway pool area of the above mentioned village while the rest are of the Indo-Islamic period.

4. INDO-ISLAMIC COINS, JASPOR, DISTRICT VADODARA.— P.M. Solanki submitted two hundred Indo-Islamic coins to the Mamlatdar of Padra taluk.

5. SILVER COINS, DUNGRI TALUK, DISTRICT VALSAD.— Eighteen silver coins probably of the Indo-Islamic period were found from Dungri taluk during the construction of the tank in Block-1710.

MADHYA PRADESH

6. COPPER COINS, MANDU, DISTRICT DHAR.— Sixty-three pre-Mughal copper coins were collected from around Mandu fort.

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[1] Information from: 2-5, Department of Archaeology and Museums, Gujarat; and 7, Department of Ancient Indian History, Culture and Archaeology, University of Nagpur; and the rest from the Survey

MAHARASHTRA

7. DYNASTIC COINS, DISTRICT PAUNAR.— Coins of the Mitras and Bhadras who ruled over the Vidarbha region in the post-Mauryan and pre-Satavahana period were found at Paunar and are preserved in the collections of Prashant Kulkarni and Raghunath Sanghi. A copper coin of the punch-marked type attributed to a king named Subandhu was also discovered and is preserved in Prashant Kulkarni's collection. New varieties of the copper coins of the Kalachuri king Krishnaraja and altogether unknown coins of Sankaragana and Bhudharaja are in the collections of Prashant Kulkarni and Chandmal Verrna. It is interesting that all these coins are in Vishnukundin fabric.

WEST BENGAL

8. COPPBR COINS, R.L.O., CALCUTTA.— Seven copper coins (pl. XXXVI B-C) belonging to Kushana period were acquired through the Returned Letter Office, Calcutta; these are now kept in the custody of the Calcutta Circle of the Survey.

IV. OTHER IMPORTANT DISCOVERIES

ANDHRA PRADESH

1. TAMIL INSCRIPTION, NANDALUR, DISTRICT CUDDAPAH.— A.P. Sagar, A. V. Vasanta Rao and C. Rama Devi discovered donatory inscriptions in Tamil on the outer plinth wall of the *garbhagriha* of Saumyanathasvami temple.

2; MEGALITHIC SITES, DISTRICT MEHBUBNAGAR.—The Department of Archaeology and Museums, Andhra Pradesh,' carried out excavations of megalithic sites having cist chambers with stone circles at Erladinne and Mustipalli under the Jurala Project.

3. EARLY COINS AND REMAINS AT DUVVAR, DISTRICT NELLQRE.— The Department of Archaeology and Museums, Andhra Pradesh, reported a mound of nearly 50 ft. (15.24m) height in Duvvur village in Sangam Mandal of the district. Preliminary survey of the site had earlier brought to light a number of coins including silver punch-marked coins of second-third century AD besides a few copper coins belonging to the Satavahana and the Ikshvaku periods. The excavtions revealed black-and-red painted ware datable to *circa* first century BC. On the basis of stratigraphical evidence, the site has been dated between the second century BC and third century AD.

4. INSCRIPTIONS AND COPPER PLATES, DISTRICT NIZAMABAD.— The Directorate of Archaeology and Museums, Andhra Pradesh, during the course of epigraphical survey in Nizamabad district covering a total of 6 taluks, reported the discovery of one hundred eighty four inscriptions belonging to various dynasties namely the Satavahana, Western Chalukyas of Kalyani, Kakatiya and Mudigonda Chalukyas.

5. STRUCTURAL REMAINS, BODHAN, DISTRICT NIZAMABAD.— The Department of Archaeology and Museums, Andhra Pradesh, reported the discovery of the foundation of a square brick cell measuring 4x4 metres and an antechamber conforming to the *sarvatobhadra* plan of the early Jaina architecture.

6. SURYA SCULPTURE, GOVINDARAOPET, DISTRICT RANGA REDDY.— A.P. Sagar, C. Rama Devi and R.Y. Krishna Rao of Hyderabad Circle of-the Survey discovered a Surya image datable to twelfth-thirteenth century AD.

DELHI

7. PROTOHISTORIC SITE, KHARKHARI-NAHAR, NEW DELHI.—B.R. Mani assisted by Urmila Sant of the Delhi Circle of the Survey discovered a protohistoric site at village Kharkhari-Nahar near

Najafgarh which yielded Late Harappan pottery besides ceramics of degenerate Siswal ware, black-and-red ware, Painted Grey Ware, grey ware and other associated wares.

GUJARAT

8. MISCELLANEOUS SCULPTURE, DISTRICT MAHESANA.— The Department of Archaeology, Gujarat State, reported the discovery of three sculptures of Lakshmi, a Surya image and an unidentified image of *circa* twelfth century and Ganesa, and a fragment each *of kumbha* and *sikhara* datable to *circa* thirteenth-fourteenth century from Vagdod in Patan taluk.

9. SIVA TEMPLE AND KUNDA, LOTESWAR -DISTRICT MAHESANA.— A temple locally known as Lotesvara Mahadeva and a *kunda* called the Pancha Pandava dating back to *circa* seventeenth century were reported from Loteswar in taluk Sami of the district by the Department of Archaeology, Gujarat State.

10. SIVA TEMPLE AND OTHER REMAINS, SONAR, DISTRICT MAHESANA.— The Department of Archaeology, Gujarat State, reported the discovery of a one hundred and fifty year old Siva temple, locally known as Bhimnath Mahadeva temple, a sixteenth century renovated well and a sculpture of Indra found in the lake near the Dudhanmata temple and part *of & sikhara,* at Sonar in Sami taluk.

11. GUPTA INSCRIPTION, THAN, DISTRICT SURENDRANAGAR.—A Gupta inscription was found near Than village in Chotila taluk of Surendranagar district. The inscription is in Brahmi script painted in ochre. The inscription is located in a deep, well-protected cave in a sandstone formation.

12. STEP-WELL, KOLIYAD, DISTRICT VADODARA.—A seventeenth century step-well was discovered by the Department of Archaeology, Government of Gujarat, at Koliyad in Karjan taluk of the district.

JAMMU AND KASHMIR

13. MISCELLANEOUS FINDS, NARANAG, DISTRICT SRINAGAR.— The Srinagar Circle of the Survey reported the discovery of sculptures and other objects datable to the eighth century AD during the course of conservation work at Naranag. These comprise of stone sculptures of Vaikuntha Vishnu (in three pieces), the hands and legs being broken (size 48 x 25 cm); four-handed Siva holding *mala* and fruit (in three pieces), the lower part and hands being broken (size 32 x 31 cm); part of a sculpture showing left side hand and leg (size 15 x 10 cm); broken lion-head (size 10x11 cm); part of two sculptures showing leg with *vanamala* (size 22 x 10 cm); votive Siva *linga* on a pedestal (size 16 x 10x8 cm); pedestal of a sculpture showing right leg of a seated deity (size 30 x 21 cm); mutilated sculpture of Ganesa (size 25 x 16 cm); head portion of Vaikuntha Vishnu (size 24 x 20 cm); water spout decorated with mythical figure of a human with bird face (size 38 x 15 cm); *sahasra-Hnga* or

Siva-linga, showing miniature *lingas* (size 48 x 29 cm); and a copper coin of Karkota dynasty showing a standing figure wearing loose attire on the obverse and a symbol on the reverse.

MADHYA PRADESH

14. ANCIENT SCULPTURES, LANJI, DISTRICT BALAGHAT.— S.N. Shrivastava of the Bhopal Circle of the Survey found sculptures of the Kalachuri period, representing Siva, Bhairava, *apsara,* etc., during the course of conservation in Lanji fort.

15. PARAMARA SCULPTURES, KHED, DISTRICT DEWAS.—Narayan Vyas of the Bhopal Circle of the Survey noticed sculptures and architectural fragments of the Paramara period in the vicinity of Khed village.

16. PAINTED SHELL INSCRIPTION, BAGH, DISTRICT DHAR.— Narayan Vyas of the Bhopal Circle of the Survey noticed painted shell inscription in red colour on the facade of Cave 3.

17. PAINTED ROCK SHELTERS, DISTRICT HOSHANGABAD.— P. Masih of the Department of Archaeology and Museums, Government of Madhya Pradesh, discovered forty two painted rock shelters in district Hoshangabad in course of her research work. These painted rock shelters are located in and around Satpura National Park and Bori Game Sanctuary between longitude 77°56'44" to 78°20*40" East and latitude 20°19'28" to 22°20'18" North and extend over an area of 101607 sq. km.

The main group of painted rock shelters are as follows :

Name of rock shelter		*Forest compart-ment No.*	*Number of rock paintings total*[1]	*Period*			
				Meso-lithic	*Chalco-lithic*	*Early historic*	*Late historic*
1		2	3	4	5	6	7
Shernala	I	486	38	47	47	11	8
Shernaia	II	486	36	5	24	6	1
-do-	III	486	154	1	74	72	7
Dhanaboi	I	238	50	7	27	5	11

1	2	3	4	5	6	7
Dhanabdi II	238	32	9	25	8	0
Mama Bhanja	264	30	10	12	8	0
Neem Chan	481	14	0	12	1	1
Gaj Patthar	236	20	0	20	0	0
Lamhi Jheet	238	17	5	12	0	0
Dundra Aam Nala	237	11	0	7	4	0
Aam Wali Kap	241	19	7	7	4	1
Hawalana	247	2	2	0	0	0
Kanmar	468	26	0	19	7	0
Beendni Patthar I	474	201	5	80	63	53
-do- II	474	80	9	39	22	10
Kurra Lane	—	29	6	11	9	3
Bharga Lane	—	13	5	8	0	0
Minka Pat I	380	2	0	2	0	0
-do- II	-do-	5	0	5	0	0
-do- III	-do-	5	0	5	0	0
-do- IV	-do-	2	0	2	0	0
-do- V	-do-	63	14	47	2	0
Khadadhar	474	73	0	44	19	10
Kumbha Jhiri	474	36	10	25	1	0
Bhurbhuri Lane	471	288	8	64	43	13
Churna Gundi I	216	155	7	53	32	72
-do- II	216	23	0	2	4	17
Chitra Katri I	189	188	3	63	65	57
-do- II	189	5	0	4	0	1
-do- III	189	63	11	27	23	2
-do- IV	189	17	1	15	0	0
Dodal Pani	217	14	0	7	7	0

1	2	3	4	5	6	7
Kakotiya Nala	29	8	0	2	6	0
Bel Khandar I	162	159	2	32	47	78
-do- II	162	4	0	34	1	0
Jumkar Nala	97	41	1	28	8	4
Bheem Kal Gufa	96	5	0	3	0	2
Deo Khala	87	10	0	1	6	3
Dhapdi Patthar	129	53	0	35	5	13
Sher Gufa	97	41	0	39	0	2
Trisul Nala	12	26	3	20	2	1
Bhurkum	33	2	0	0	0	2

The subject-wise distribution of these paintings are under :

Human figure —1291

Animal and birds —616

Miscellaneous — 59

Paintings of two giraffe, winged horse, life-size bison and boar, horse-faced "Turran Devta" which is still worshipped by Korkus, Mermaids, *"Chhatris"* which are still used by Korkus in marriage processions, wicked god with string of human skull, elaborate family scenes, etc., are noteworthy.

18. ANCIENT PILLAR, SANCHI, DISTRICT RAISEN.— D.K. Richaria of the Bhopal Circle of the Survey noticed a *yashti* pillar made of yellow sandstone around Stupa 1.

19. MEDIEVAL POTTERY, TIONDHAR, DISTRICT REWA.— P.K. Mishra of the Bhopal Circle of the Survey collected medieval pottery from Tiondhar.

MAHARASHTRA

20. PAINTINGS, CAVE 12, ELLORA, DISTRICT AURANGABAD.— P.N. Kamble assisted by M.R. Dhekane, G.L. Gaikwad at S.D. Vyas of the Aurangabad Circle of the Survey, in the course of inspection, brought to light several phases of paintings. The colour used in the paintings are mostly red, green and white.

21. PLAQUES OF THE MOTHER GODDESS LA.UA, PAUNI, DISTRICT BHANDARA.— Two plaques depicting the mother goddess Lajja were noticed by the Department of Ancient Indian History, Culture and Archaeology, Nagpur University, at Pauni in the locality known as Tadesvara ward. One plaque is kept in a small shrine on a platform alongwith some broken legged querns, worshipped as Matamai while the other is in a private shrine.

22. INSCRIPTION, MANSAR, DISTRICT NAGPUR.— Ismail Kellelu of the Department of Ancient Indian History Culture and Archaeology, Nagpur University, discovered a short inscription on a rectangular stone chunk on the northern slopes of the Hidimbachi tekadi situated about 1 km east of the village Mansar, Tehsil Mauda, district Nagpur. The stone chunk looking like a slab is actually part of a big boulder peeled off as a result of weathering. The slab is about 2 m x 1.5 m with a maximum thickness of about 20 cm. The inscription in typical Sankha *lipi,* is engraved on the right side bottom of the slab and runs obliquely with three or four chain-like characters. One of the characters (top one) is circular and engraved in bold type.

23. MISCELLANEOUS SCULPTURES, MANSAR, DISTRICT NAGPUR.— The Department of Ancient Indian History, Culture and Archaeology of the Nagpur University reported the discovery of an early sculpture of Surya belonging to the Satavahana period. It is in folk style and depicts the god seated in *utkutasana* and is holding a lotus stalk and a dagger. The icon is in high relief and a halo depicting triangular border is carved. The chariot is shown symbolically by engraving a wheel in the centre of the forepart and a horse each on the left and the right sides of the pedestal. The second is a fragmentary sculpture of the river goddess Yamuna broken into several pieces. The hand, part of the belly and the lower portion are missing; but the position of her hand carrying pitcher suggests that she may be no other than Yamuna. It has been shifted to the Central Museum, Nagpur.

WEST BENGAL

24. MOUNDS AND SCULPTURE, BANYETKUR, DISTRICT BANKURA.— In the course of exploration, TJ. Chakraborty of the Calcutta Circle of the. Survey discovered two mounds in the village Banyetkur, P.S. Jaypur. While the bigger mound represents a temple complex below which is an earlier settlement as well, the smaller mound is devoid of any structural remains. However, a beautiful stone image of Uma-Mahesvara of tenth-eleventh century AD was found near the mound. Scattered brickbats, potsherds, etc., indicate the existence of a medieval settlement here.

25. TEMPLES, GOPINATHPUR AND KHIRKEONDI, DISTRICT HOOGHLY.— TJ. Chakraborty of the Calcutta Circle of the Survey discovered flat-roofed brick temple of eighteenth century in Gopinathpur village and a temple complex consisting of five temples in Khirkeondi village. While the main *navaratna* temple locally known as the Sridhar temple is surrounded by boundary wall, the four other *atchala* temples with rich terracotta ornamentation in the front facade are outside the boundary wall. This complex belongs to the eighteenth century.

26. BRAHMANICAL IMAGES, ADINA MOSQUK, PANDUA, DISTRICT: MALDA.— The Calcutta Circle of the Survey discovered in course of conservation work two images of Ganesa and Siva inside the dislodged portion of the masonry wall.

27. IMAGE OF SURYA, EKLAKHI, DISTRICT MALDA.—B. Bandyopadhay of the Calcutta Circle of the Survey located an image of Surya belonging to *circa* eleventh-twelfth century.

28. MOUNDS AND SCULPTURE OF VISHNU, JALESWAR, DISTRICT 24-PARGANAS (NORTH).— S.S. Biswas and S.K. Ghosal of the Calcutta Circle of the Survey, alongwith S.C. Mukherjee of the Department of Archaeology, Government of West Bengal, located two mounds at Jaleswar in P.S. Gaighata, locally known as Sivapota and Bhogapota datable to around tenth-eleventh century AD. One stone image of Vishnu of the same period was recovered from one of the mounds and is now kept in a recently-built temple on the mound Sivapota.

29. MOUND ANDSTRUCTURE,SIMULIA,DISTRICT24PARGANAS<NORTH).—S.S. Biswas and Samar Kumar Ghosal of the Calcutta Circle of the Survey, alongwith S.C. Mukherjee of the Department of Archaeology, Government of West Bengal, visited and inspected the mound, locally known as Mangalpota, at Simulia in P.S. Gaighata and ascertained the nature, importance and period of the finds. The mound is approximately 6 metres in height and 100 metres in circumference. The exposed portion of the structure, embedded beneath the mound, shows that .it is a religious structure with beautiful niches and mouldings. It appears that the ruins may be that of a temple as. indicated by the *chaitya* windows and possibly a votive tank with regular recesses in front. The antiquities examined corroborate a date of *circa* tenth-eleventh century AD which is also the probable date of the religious structure.

V. RADIOCARBON DATES[1]

The following radiocarbon measurements were made on archaeological and Quaternary samples[2] during the period (April, 1989 to March 1990). All the dates are based on 5730 ± 40 years half life value of radiocarbon. The year 1950 is the base year to convert these dates into AD/BC scale. All the dates are unconnected for $^{14}C/^{12}C$ variation.

ARABIAN SEA

1. OFF MALABAR COAST

i.	PRL-1338. quaternary Sediment cores from 0-5 cm depth. Core no. SK-46-2.	5110+110 (3160 BC)
ii.	PRL-1340. Quaternary Sediment cores from 20-25 cm depth. Core no. SK-46-2. _	9700±130 (7750 BC)
iii	PRL-1342. Quaternary Sediment cores from 35-40 cm depth. Core no. SK-46-2.	10400±180 (8450 BC)
iv.	PRL-1343. Quaternary Sediment cores from 0-2 cm depth. Core no. SK-46-1	6010+180 (4060 BC)
v.	PRL-1348. Quaternary Sediment cores from 37-40 cm depth. Core no. SK-46-1. vi.	8060+180 (7110 BC)
vi	PRL-1352. Quaternary Sediment cores from 80-82 cm depth. Core no. SK-46-1.	10170±130 (8220 BC)

"Contributed by Sheela Kusumgar and M.G. Yadava of the Physical Research Laboratory, Ahmedabad. Further details of the dated samples can be obtained from excavators.

[2]Samples submitted by : 1, National Institute of Oceanography, Panjim, Goa; 2» Deccan College, Pune; 3 & 4, Department of Earth Sciences, University of Roorkee, Uttar Pradesh; 5, Prehistory Branch, of the Survey; 6, PRI, Navrangpara, Ahmedabad, Gujarat; 7, Department of Ancient History, Culture and Archaeology, University of Allahabad; 8-10, Department of Botany, D.S.B.C. College, Kumaon University, Nainital, Uttar Pradesh.

GUJARAT

2 KUNTASI DISTRICT RAJKOT

i. PRL-1370. Harappa Culture — 3820±170
Charcoal from Trench J5; Locus NW Qdt. — (1870 BC)
Layer 12; depth 0-7 m.

ii. PRL-1371. Harappa Culture — 3750+140
Charcoal from Trench Fl; Lous KTS1, — (1800 BC)
ST-16, Room 4, Layer 7, depth 1 m.

HARYANA

3. GUDAH, DISTRICT KARNAL — 4210+60
PRL-1337. Quaternary — (2260 BC)
Calcium carbonate *kankar* from
soil profile, from sandy clay
loam; depth 1.35 m.
Sender's sample No. 22/6

4. URLANA, DISTRICT KAITHAL — 8240^{+440}_{-420}
PRL-1336. Quaternary — (6290 BC)
Calcium carbonate *kankar*
from soil profile; from silty
clay loam; depth 115 m.
Sender's sample no. 21/4.

JAMMU AND KASHMIR

5. KIARI, DISTRICT LEH

i. PRL-1400. Neolithic Culture — 289Otl60
Charcoal from oven, Trench-Kiari I, — (940 BC)
Layer-Boulder deposit, depth-1-85 m.
Sender's sample no. KIARI/CH/89-4.

ii. PRL-1401. Neolithic Culture — 2830+130
Charcoal from hearth, Trench-Kiari I, — (880 BC)
Layer-Gravel deposit, depth-1 -25 m.
Sender's sample no. KIARI/CH/89-3.

iii. PRL-1402. Neolithic Culture — 277G±120 (820 BC)
Charcoal from hearth, Trench-Kiari I,
Layer-Boulder deposit, depth-1-30 m.
Sender's Sample no. KIARl/CH/89'2.

6. MANASBAL, DISTRICT SRINAGAR
PRL-1372. Lake sediment — 1830±130 (AD 120)
Organic mud from Lacustrine Core MO
depth 2-5 m.
Sender's sample no. MO-97.

UTTAR PRADESH

7. BHUJIAGHAT, DISTRICT NAINITAL
PRL-117. Quaternary — Modern
Calc-tufa from exposed layer of Bhujiaghat Siwaliks,
Sender's sample no. 5.

8.. KHURPATAL, DISTRICT NAINTTAL PRL-1118. Quaternary
Calc-tufa from exposed layer of Khurpatal — 6060±140 (4110BC)
Kral group. Sender's sample no. 6

9. DAMDAMA, DISTRICT PRATAPGARH
i. PRL-1077. Mesolithic Culture
Charred bone from Trench M-7, M-8, — 4040±110 (2090 BC)
Layer 4, depth 0-55m.
Sender's sample no. AU/DDM/3.

ii. PRL-1080. Mesolithic Culture
Charred bone from Trench M-8, — 4540±110 (2590 BC)
Layer 8, depth 0-85 m. Sender's
sample no. AU/DDM/6.

10. SUYALBARY, DISTRICT NAINITAL
PRL-1116. Quaternary
Calc-tufa from exposed layer of Nathuakhan Formation. — 660±150 (AD 1290)
Sender's sample no. 4.

VI. PALAEOBOTANICAL AND POLLEN ANALYTICAL INVESTIGATIONS[1]

The present report incorporates the work done at Birbal Sahni Institute of Palaeobotany, Lucknow.

PUNJAB

1. MAHORANA ANA, DISTRICT SANGRUR.— Some broken pieces of large-seeded legume from Mahorana Period IB *(circa* 2100-1900 BQ witnessing a gradual transformation of the pre-Harappan to Bara Culture, in the ash content of the sample from trench MRN. 42 UX-41 were critically examined. They revealed morphological affinities with the cotyledons of hyacinth bean *(Lablab purpureus;* Syn. *Dolichos lablab).* The evidence of hyacinth nth bean at Mahorana is the earliest so far recovered in India and now reported for the first time in the Harappan context. This bean happens to be a popular vegetable crop and needs frequent irrigation. The cultivation of vegetable crop by the skilled pre-Harappan or Baran farmers, certainly indicate a great advancement in arbori-horticultural practices over the general agricultural practices.

2.ROHIRA, DISTRICT SANGRUK.— In continution of the report on wood remains from the mature Harappan period *(I9S5-S6,* p. 122), further investigation was made on the wood charcoal remains from the pre-Harappan and mature Harappan deposits at Rohira. The complete picture of the exploration of timber taxa at this site from *circa* 2300-2000 BC is given below:

A. Pre-Harappan Period *(circa* 2300-2000 BC) : Wood charcoals have been identified as belonging to *babul (Acacia nilotica). kareel (Capparis aphylla), jhau (Tamarix dioiga),* teak *(Tectona grandis), toon (Cedrela toona), khinrni (Manilkara hexandra),* deodar *(Cedrus deodara), henna* or *mehndi (Lawsonia inermis)* and grape-vine *(Vitis vinifera).*

B. Mature Harappan Period *(circa* 2000-1700 BC): Wood charcoal remains of *babul (Acacia nilotica), khejri (Prosopis spicigera),jhau (Tamarix dioica), sheesham (Dalbergia* sp.), jujube or *ber (Ziziphus* sp.), grape-vine *(Vitis vinifera)* and *parijat (Nyctanthes arbor-tristis)* have been identified.

Predominance *of Acacia, Tamarix, Capparis, Ziziphus* and *Prosopis* in the collection indicates that these locally available species were utilized by the settlers at Rohira as fuel and to meet out other requirements. Teak was made available from the forests of central India and deodar from the Himalayas. *Sheesham* is found in the sub-Himalayan tracts and Himalayan valleys upto 3,000 feet, from the Indus to Assam; gregarious in the forests of upper Gangetic plains.

Lawsonia or *mehndi* is a shrub cultivated throughout India as a hedge plant and for its leaves which, powdered and made into a paste, give the *'hina'* dye which is used for colouring the handpalm and nails. The evidence of its cultivation at Rohira is, therefore, of considerable cultural significance. The charcoals of grape-vine stem have been found at different cultural horizons right from *circa* 2300

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[1]Contributed by K..S. Saraswat and Chanchaia *of* inc. Birbal Sahni Institute of Palaeobotany, Lucknow-226007.

upto 1700 BC mixed with the remains other local woods. Together with the evidence of grape seed from Rohira *(1984-85,* p. 161), it seems that the settlers made use of the waste portions of grape-vine after pruning as fuel, along with other locally available fuel woods. Circumstantial evidence of grape seed and the grape-vine charcoals may be regarded in order of likelihood for the cultivation of grapevines in Punjab during the pre-Harappan and Harappan times *(circa 2300-VJJM)* BC).

Parijat, a well known tree grown for fragrant flowers which open at night and drop off in the morning is found in wild state in the sub-Himalayan forests upto 5000feet, from the Chenab to Nepal. The flowers *of parijat* or *harsingar are often* used for garlands and employed in rituals as well.

UTTAR PRADESH

3. HULASKHHKA, "DISTRICT LUCKNOW.— Wood charcoals have been studied from different cultural horizons of Hulaskhera dating Bade from 800 BC to AD500. *Mahua (Madhuca indica). sal (Shorea robusta), babul* or *khair (Acacia* sp.), *toon* (Cedrela sp.), jujube *(Ziziphus* sp.) and *jarul* or *dhaura (Lagerstroemia* sp.) have been identified from the Black-slipped Ware phase (800-600 BC). Wood remains from the subsequent Sunga, Kushana and Gupta periods have tentatively been identified as those of families Anacardiaceae, Combretaceae, Leguminosae, Lythraceae, Meliaceae and Rubiaceae

In continuation of the crop remains already reported *(1987-88,* p. 152) a large number of weeds and other wild taxa have been identified, to sketch the ecological perspectives of agricultural fields at Hulaskhera (800 BC-AD 500). The assemblage of the carbonised seeds and fruits include *Commelina benghalensis, Dactylocienium aegyptium, Eleusine indica, Echinochloa crus-galli, Trianthema ponuhicastrum. Scleria data, Lathyrus aphaca, Polygonum barbatum, Trigonella occulta, Sida a spinosa, Datura stramonium, Desmodium gangetiewn* and the species *of Fimhristylis, Portulaca, Pamcum, Cyperus, Elaeocharis, Chenopodium, Solanum, Vicia, Poa* and *Carex.*

VII. MUSEUMS

1. ARCHAEOLOGICAL MUSEUM, AMARAVATI.— The collection of the museum was enriched by acquiring five copper plate grants from Guntur and Prakasam districts, four inscribed pillars and one stone image of Mahishasuramardini of the mediaeval period from the Amaresvara temple, Andhra Pradesh. Two wall showcases were arranged in Gallery No. 3 for the display of minor antiquities.

3. ASSAM STATE MUSEUM, GUWAHATL— The Assam State Museum collected a good number of objects .from different places in Assam among which the important pieces are : five illustrated manuscripts, *Anadi Patan, Bhagavata, Shymanta Harana, Rantayana* and *Mahabharata;* two metal images of Krishna datable to the nineteenth century from Pulibar Satra, Jorhat; seven terracotta sculptures datable to about eighteenth-nineteenth century from Pulibar Satra, Jorhat; seven terracotta sculptures dtable to bout eighteenth-nineteenth century from Dudhnai in district Goalpara; and sale deed of eighteenth century from Silsako, North Guwahati, about purchase of a woman. The *Anadi Patan* and *Bhagavata* manuscripts were collected from Kuji Satra in Nagaon district while the *Ramayan* and the *Mahabharata* were collected from Joriiat. One hundred and fifty Koch copper coins (half-done, Bhutanese copied) were purchased from Darranga mela in Nalbari district. Three gold ornaments which are more than one hundred years old were acquired from Uluberi, Guwahati.

2. ARCHAEOLOGICAL MUSEUM, BDAPUR.—One island showcase was completed for display of coins. Glass panes have been provided to the showcases containing porcelain jars in the Gallery No 6. Trilingual labels were provided to all the exhibits.

4. PRINCE OF WALES MUSEUM OF WESTERN INDIA, BOMBAY.— The museum acquired one hundred and forty-seven antiquities during the year, which comprise of printed cotton *rumals* and *Kalamkari* pieces, portraits on glass of a Maratha nobleman from Satara, *Paithani sari, pataka* (turban cloth), embroidered *sari* border, silk brocades, puppets of leather and tortoise shell, masks, paintings on cloth, wooden figures, sextant, etc.

5. INDIAN MUSEUM, CALCUTTA.—During the year the Archaeological Section of the museum was enriched by the acquisition of the following antiquities and coins through purchase and gift: (a) eighteen stone objects belonging to different periods and provenance including one Buddha image and four inscribed slabs; b) one hundred and twenty-five terracotta and clay objects of different periods and sites; c) three copper plate inscriptions; d) nineteen bronze sculptures which include two Chola bronzes; e) fifteen stone, terracotta and clay seals; f) nine gold and two copper ornaments; g) one ivory sculpture; h) one wooden sculpture; i) three objects of precious and semi-precious stone including one Buddha image on ruby and two strings of beads from Chandraketugarh; j) thirty-one miniature pots and four potsherds inscribed in Kharoshthi script or both Kharoshthi and Brahmi scripts; k) four minor objects made out of horns and one female figure in bone; 1) three hundred and

five coins of gold, silver and copper of different periods. Some of these are very important from the numismatic and aesthetic point of view. For example, mention may be made of bar pieces, saucer shaped coins, coins of Chandragupta I, Kumargupta I, Udayadeva, Jayadeva, Muhammad Bin Sam, Solaiman, Kamran, Zodiac Siyar Udayamsnikya, Alimardan, Sikandar Shah of Bengal and others.

The work of renovating the Java Bay of the Long Gallery was taken up while renovation of the Bhumara Bay was completed. Repainting of the showcases of the Minor Arts' Gallery was in progress. Preliminary arrangement for the reconstruction of the Pre-and-protohistoric Gallery was in progress. The Cellar Godown was provided with new iron gates. Printed labels of the displayed antiquities including both general and individual labels was nearing completion. Lamination of the printed labels as well as labelling of remaining objects was in progress.

6. ARHAEOLOGICAL MUSEUM, CHANDRAGIRI.— The museum acquired bronze sculptures from the Hyderabad Circle of the Survey and one small boulder inscribed with early Telugu-Kannada script.

7. MATTANCHERRY PALACE MUSEUM, COCHIN.—The museum acquired nine wooden objects (pl. XXXVII) from the Bombay Customs, one brass jar and ten coins of the Cochin Maharajas from the Fort St. George Museum, Madras.

8. DISTRICT MUSEUM, CUDDAPAH.—Five inscribed slabs belonging to the Bana and Vaidumba dynasties of the sixth-seventh century AD were shifted from the Collector's bungalow to the museum.

9. ARCHAEOLOGICAL MUSEUM, RED FORT, DELHI.— To strengthen the security measures, one generator set was installed with the provision of halogen lamps at suitable points. The central hall was provided with venyle floor covering.

10.. INDIAN WAR MEMORIAL MUSEUM, RED FORT, DELHI.— Damaged glass panes in the showcases were replaced by transparent perspex sheets. The old labels were renewed and carpets laid in the Gallery 5 leading to the Gallery 6.

11. ARCHAEOLOGICAL MUSEUM, VELHA GOA, GOA.— Jute carpet was provided to the staircase in the Gallery 5 and 6.

12. ARCHAEOLOGICAL MUSEUM, HALEBID.— The museum collection was enriched with the addition of sixty-one antiquities acquired from the Bangalore Circle of the Survey.

13. ARCHAEOLOGICAL MUSEUM, HAMPI.— The museum acquired twelve antiquities including three gymnasium, five copper coins and one small copper plate. Reorganization of the Gallery No.

2 was completed. Laminated photographs of the Vijayanagara monuments were displayed in the corridor of the museum. The "World Heritage Day" and the "World Heritage Week" were celebrated by organizing a photo exhibition, screening of documentary film, slide shows and other cultural activities.

14. STATE MUSEUM, HYDERRABAD.— The museum acquired one hundred and seventy-three objects comprising of sixty-one bronze objects, one hundred and ten wooden sculptures and two paintings. One thousand, six hundred and ninety-three coins of various dynasties and thirty-one lots of treasure-trove from various districts of Andhra Pradesh were also added to the collection. The treasure-trove finds consist of gold and silver ornaments, some of which could be dated to the fourteenth-fifteenth century and eighteenth-nineteenth century.

15. GOVERNMENT MUSEUM, JHANSI.— The museum acquired one hundred and eighty-nine antiquities during the year. One gold coin each of the Chandella rulers Madana Varmana and Govinda Chandra, a line drawing of a nude female, perhaps representing some tantric them and an erotic figure dated Samvat 1821 are the noteworthy objects.

16. ARCHAEOLOGICAL MUSEUM, KHAJURAHO.— The museum acquired the bust of a female figure *(nayika)* and the other of a lower part also of female *(nayika)* in stone, from the premises of the Tourist Office, Government of India, at Khajuraho. These two sculptural pieces adorned once the temples of the Chandellas at the site there.

17. ARCHAEOLOGICAL MUSEUM, KONDAPUR.—Organization work was taken up in the museum and running showcases were provided for display of minor antiquities of the early historic period.

18. ARCHAEOLOGICAL MUSEUM, LOTHAL.—One scale model of the excavated site at Lothal was prepared and displayed in the museum. An exhibition was arranged in connection with the "World Heritage Day" during the year.

19. STATE MUSEUM, LUCKNOW.— The museum acquired eighty-five objects during the year which comprised of sculptures, terracottas, textiles, coins, paintings, copperplates, seals, etc. Among these, a beautiful headless sculpture (pl. XXXVIII A) wearing bracelets, armlets and necklace," datable to *circa* second century BC and a seated Uma-Mahesvara image (pl. XXXVIIIB) of *circa* eleventh-twelfth century with the depiction of five *Siva-lingas on* top are worthy of mention; both these were from Allahabad.

20. GOVERNMENT MUSEUM, MADRAS.— The museum acquired a number of images and various other objects through treasure trove from different places of Tamilnadu. Of these, important ones include images of seated Kali from Vedasandur, in district Anna; standing Siva from Kannanmangalam

and two Tirthankaras one Mahavira, one Parsvanatha, two Devi figures, two *chauri*-bearers from Salukkai in district North- Arcot; one crawling Krishna from Melakkidaranur in district Ramanathapuram; Vishnu from Nallur in district Salem; two crawling Krishna, one Devi from Edappalayam and Ganesa,, seated Devi, standing Devi, seated Kali and Siva from Elleri in district South Arcot; Vishnu, Sri-devi, Bhu-devi, Venugopala, Rukmini, Satyabhama, Kaliyakrishna, Balakrishna Srinivasa from Viragalur in district Tituchi; Somaskanda from Udayarnarthandapuram and Vishnu, Devi from Nandavanampatti; Nataraja, three Devi figures from Valangaiman; and three Devi sculptures from Vadapadimangalam in district Thanjavur besides a few other miscellaneous objects from Chengalpattu, Kanyakumari, Pudukkottai and Thanjavur districts of the State.

21. FORT ST. GEORGE MUSEUM, MADRAS.— The museum acquired two hundred and five coins, one medal from Bombay Customs and five copperplates of British ships from the Port Trust, Madras, Tamil Nadu. An exhibition was organized in the museum in collaboration With the Department of Tourism, Government of Tamil Nadu, to commemorate the 350th anniversary of Madras, Tamil Nadu. The museum also published multi-coloured brochure in English.

22. DISTRICT MUSEUM, MAHBOOBNAGAR.— Twenty-six stone sculptures from the villages Erladinne, Mustipalli and Upperu under the Jurala Project and ten stone Chalukya sculptures from Koppunuru village under the Srisailam Project were shifted to the museum.

23. GOVERNMENT MUSEUM, MATHURA.— During the year under review, one thousand, seven hundred and sixty nine objects were received through acquisition, gift and purchase. These include eleven stone sculptures, fourteen terracottas, one stone inscription, one clay seal, twenty eight gold and silver ornaments, four gilt ornaments, two textiles, three art ware, twenty six paintings, one medallion, ten gold coins, six hundred and forty-two silver, one thousand and seven copper and nineteen alloy coins. Among these red sandstone head of Siva (pl. XXXVIII C) and large stele representing an image of standing goddess Vasudhara (pl. XXXVIII D) of the Kushana period deserve mention.

24. HAZARDUARI PALACE MUSEUM, MURSHIDABAD.— Reorganization work was taken up in the Hall of the Royal Exhibits with painting and colour washing and completed with the display of an ivory *jhapanak* (palanquin) of Zebunnisa, daughter of Aurangzeb and an ivory *tanjam* (sedan chair) of Shah Jahan with the help of human model-bearers to indicate the mode of their actual conveyance (pl. XXXIX A-B). The silver throne displayed in the Durbar Hall (pl. XXXIX C) and in the Committee Room have been provided each with transparent perspex sheet casing for safety and clear visibility of the objects. The paintings in the Dewans' Gallery, Portrait Gallery of the Nawab Family and in the Hall of the Royal Exhibits have been provided with brass labels. The Manuscript Room was provided with air-conditioner for better preservation of records and rare manuscripts.

New electric lines were provided in the British Portrait Gallery, Landscape Gallery, Dewans' Gallery, Portrait Gallery of the Nawab Family, Hall of the Royal Exhibits and also in the Library and Manuscript Room and completed with other outfits. Besides the provision of iron grills and collapsible gates to the window-openings, one 10 KVA generator set was installed for proper safety and security of the Museum.

Coir carpeting was provided in the Portrait Gallery of the Nawab family, Dewans' Gallery, Portrait Gallery of the Nawab-Nazims and also in the staircase of the north-west landing in close symmetry to their corresponding axis.

25. CENTRAL MUSEUM, NAGPUR.— Shri Kulkarni from Bhandara has given his collection of metal objects to this museum on loan basis. This collection includes sculptures, seals, lamps, etc.

The work of Reorganization of sculpture gallery was in progress. Additional sculptures from this gallery were provided with wooden pedestal:

26. PATNA MUSEUM, PATNA.—During the period under review, the museum acquired one black basalt image of standing four-handed Vishnu of *circa* eighth-ninth century from village Dhanarua, P.S. Masaurhi, district Patna.

27. ARCHAEOLOGICAL MUSEUM, SANCHI.— The work of painting and colour-washing was completed with the replacement of old labels by new ones in the Gallery 1.

28. ARCHAEOLOGICAL MUSEUM, SARNATH.— False wall was provided on one side of the main hall and the mosaic tiles flooring laid in Gallery 2.

29. TIPU SULTAN MUSEUM, SRIRANGAPATNA.— The museum acquired one dagger with the handle of parallel bars *(jamdhar)* of exquisite workmanship.

3D. BIIARAT KALA BHAVAN, ART AND ARCHAEOLOGICAL MUSEUM, VARANASI.—The museum acquired ninety-two coins, one inscription on stone, sixteen stone sculptures, seven terracottas and one hundred and eighteen paintings during the year. Of the ninety-two coins, eighty-eight were copper punch-marked coins found from Gaya and four of gold. Out of the four gold coins, one was of Kanishka with his standing figure offering at the altar on the obverse and standing Buddha on the reverse; the second was of Vasudeva with the king standing and offering at the altar on the obverse and standing Siva with bull on the reverse; the third was of Kacha with the standing figure of the king on the obverse and standing goddess with cornucopia on the reverse while the fourth coin was of Alaud Din Khalji dated AH 711 (AD 1311) having on the obverse the *kalima* in the centre and the name of the four Khaljis in the margin and on the reverse the legend alongwith the name of Alaud' Din and the mint name Delhi. The coin of Kanishka as well as that of Alaud' Din Khalji are rare. Out of

the seven terracotta figurines, a male head and upper portion of a female figurine both of the Sunga period, a male head of the Kushana period and fragment of a Buddha image of the Gupta period are important.

Among the important sculptures acquired during the year are a crowned image of Surya of eighth century AD, a broken Krishna *lila* scene of ninth century, an eleventh century female bust, a flying *vidyadhara* of *circa* AD 1000, a broken *devadasi* and a decorated male bust of the twelfth century and a Surya image, *navagraha* figure, Siva-Parvati (all three broken) arid a dancing *yakshini* of the sixteenth century.

Of the three metal objects, one is a silver *chilum* and a bronze lady in dance posture on the back of a peacock, probably a melon-shaped bronze pitcher with leaves on the neck and lower portion.

The other important objects are : a plate of Ganga-Yamuni work and two *huqqa* bases with geometrical designs and leaf decoration in Bidari ware, an oval-shaped ivory piece with perhaps the golden temple of Amritsar painted over it, one mica painting, perhaps of Kalki *avatar a,* two portraits, one of Giidharilal of Nathdwara and the other of Maharaja Mahip Narayan Singh of Kashi and six paintings of eighteenth, nineteenth and twentieth centuries, a painted wooden box and one hundred and ninety-seven *ganjifa* cards.

31. DISTRICT MUSEUM, WARANGAL.— Two portions of pillars and a bronze image of Umasahita Chandrasekharamurti were shifted from the Ujjali base Masjid near Hanamkonda to the museum.

VIII. ARCHITECTURAL SURVEY

TEMPLE SURVEY, NORTHERN REGION.— The Temple Survey Project (Northern Region) of the Survey under B.L Nagarch continued the survey of the temples of the Paramaras. These include the Boresvara Mahadeva temple at Dangwada, the Dhurjatesvara Mahadeva temple at Dhulet, Hinglajamata temple at Bari Delchi, all in district Ujjain, and the ruins of temples at Kotara in district Dewas.

The Boresvara Mahadeva temple at Dangwada consists on plan of a sanctum approached by a flight of seven descending steps, an *antarala* and a *sabha-mandapa* with three *mukha-mandapas* on the eastern, northern and southern sides. The sanctum enshrines a Siva-/mga installed on *ayoni-patta. The* walls of the sanctum are plain except a niche each in the westem,northem and southern walls. The sanctum-doorway shows seated Ganesa on the *latatabimba.* The elevation of the temple shows from bottom upwards *khura, kumbha, kalasa* and *kapota* surmounted by *jangha* showing a niche in each of the three *bhadras* and divided into three compartments by two median bands. Above *the jangha* rests the *kutachhadya* supported by brackets. Above this rests the *sikhara* which had collapsed and has been restored in modem times. The temple, facing east, is *pancharatha* on plan and elevation. The original temple has been heavily restored during recent times. The other Paramara sculptures which were recovered from the site of Boresvara Mahadeva temple have been re-fixed in the walls of another shrine at the site. Noteworthy among these sculptures are those of Andhakasuravadhamurtti of Siva, Nataraja, a *saptamatrika* panel and images of *surasunddris.*

The Dhurjatesvara Mahadeva temple at Dhulet stands on a platform and consists on plan of a sanctum, an *antarala,* a *sabha-mandapa* and an *ardha-mandapa.* The temple, facing east, is dedicated to Siva. The sanctum enshrines a *Siva-linga* and has plain walls relieved by a aiche each in the southern, western and northern walls. The ceiling of the sanctum consists of eight tiers of receding octagons and shows on the top a square containing a full-blown lotus. The sanctum is approached by a flight of two descending steps and the sanctum-doorway consists of five *sakhas* showing four-armed seated Ganesa on the *lalatabimba.* The northern and southern walls of the sanctum have each a niche which is vacant at present The *antarala* ceiling is flat, plain and is supported by two pilasters. The architrave of the ceiling is carved with a frieze of flying *vidyadhara* couples carrying garlands. The ceiling of the *sabha-mandapa* rests on eight pillars and four pilasters arranged in four vertical and three horizontal rows and is divided into six compartments. The *ardha-mandapa* enshrines a modem image of seated Nandi and its ceilingrests on four pillars. The elevation of the temple shows, from bottom upwards, two plain *bhittas* that support the *adhishthana* mouldings consisting of plain *khura, kamika, kumbha* decorated with a band of diamonds and rosettes and a niche containing diamond design, plain *kalasa* and *kapota* decorated with *kudus.* The sanctum is *pancharatha* on plan and elevation. The *adhishthana* mouldings support the plain *jangha* which is divided into two compartments by a plain median band and shows a niche each on the southern,

western and northern *bhadras* which are lying vacant. The *jangha* supports a *kutachhadya* which rests on plain corbelled brackets. Above the *kutachhadya* rests the *pancharatha sikhara* of *bhumija* style, which is decorated in each of the four quadrants with four miniature shrine-models and. with two *urusringas* on the spine *(mulamanjari)* which are decorated with *mangala-kalasas.* The *sikhara* is a later restoration and crowned by *griva, amalaka, kalasa* and *bijapuraka.* The roof of the *antarala* and the *sabhamandapa* are flat and a parapet wall runs on their eastern, southern and northern sides. The temple is located inside an enclosure wall provided with bastions at each of the four comers. On the basis of its architectural style, the temple is assignable to the twelfth century AD.

The Hinglajamata temple at Bari Delchi is built of white sandstone masonry and consists on plan of a sanctum, an *antarala* and an *ardha-mandapa.* The temple stands on a high platform with its *pancharatha* sanctum. The exterior facades of the sanctum are plain and are relieved on the southern, western and northern *bhadras* by a niche which is lying vacant. The walls of the sanctum support *kutachhadya* above which rests the *pancharatha sikhara* crowned by an *amalaka, chandrika, kalasa* and *bijapuraka.* In fact the sanctum and the *sikhara* above it have been restored in modem times. The roof of the *ardha-mandapa* is flat and is provided with a parapet wall decorated with merlons. The interior of the sanctum is plain and there is a cusped niche in its southern, western and northern walls. Inside the niche in. the western wall are enshrined three images, assignable to twelfth century AD, the central one being those of six-armed Mahishamardini Durga while, the side ones being those of standing Vishnu and Surya. The walls of the sanctum support a circular ceiling resting on two octagons. The centre of the ceiling is decorated with a full-blown lotus. The sanctum doorway is plain and shows on the *lalatabimba* an image of seated Ganesa. The walls of the *antarala* are plain and are provided with a niche each in the southern and northern walls. The ceiling of the *antarala* is supported by four pilasters, one at each of the four comers. The original temple was built in twelfth century AD during the reign of the Paramaras.

In addition to the above, the Bhumija temples of Rajasthan including the Siva temple at Rarqgarh, district Kota, the Undesvara Mahadeva and Hajaresvara temples at Bijolia, district Bhilwara, the Mahanalesvara temple at Menal, the Adbhutanatha and Samidhesvara temples at Chittaurgarh in district Chittaurgarh, the Surya temple at Ranakpur, district Pali, Mahavira temple at Sewari in district Pali and the ruins of temples at Chandravati, district Sirohi were also studied and surveyed.

The Siva temple at Ramgarh (pl. XLA)is about half a century later in date than the Udayesvara Mahadeva temple at Udaipur, district Vidisha. On plan the temple consists of *zsaptaratha* sanctum, an *antarala,* a *sabha-mandapa* with lateral transepts and an *ardha-mandapa.* The interior of the sanctum is, however, plain but for a niche in the western wall. In the northern wall of the sanctum is fixed a protruding stone lintel. The ceiling of the sanctum is of *nabhichchhanda* variety and is decorated on the top with a full-blown lotus. The sanctum enshrines a *Siva-linga* installed on *yoni-patta* and a seated Nandi. The sanctum-doorway is composed of seven *sakhas.* The *lalatabimba* contains an image of seated Parvati inside a niche. The walls of the *antarala* are plain and its *com*ing

consists of *kola* and *gajatalu* courses. The ceilings of the *sabha-mandapa* and its lateral transepts rest on eight tall pillars and twenty-four dwarf pillars which are richly carved. The elevation of the temple from bottom upwards shows *pitha* mouldings consisting of two plain *bhittas* which support a *pattika,* decorated with diamonds in panels while another *pattika* is carved with diamonds and rosettes. Above this rests the *jadyakumbha* ornamented with lotus-petals, *kudus* and *hamsa mithunas.* Above *the jadyakumbha* rest the *karnika, a pattika* decorated with diamonds and rosettes and friezes of *kirttimukhas,* elephants, lions, horses and human beings. The *adhishthana* mouldings above this consist *of khura* carved with a frieze of diamonds, *kumbha* with friezes of diamonds and rosettes and niches containing images of seated deities, plain *kalasa,* a recess decorated with a frieze of diamonds and *manchika* carved with diamonds and rosettes respectively. These *adhishthana* mouldings support *the jangha* which is decorated with a single row of sculptures. The *bhadra-niches* on *the jangha* of the sanctum show Siva killing a demon probably Andhaka on the south and Nataraja on the west and north. Above *the jangha* rest the *varandika* mouldings consisting of a *karnika,* double *padma* and *khura-chhadya.* These mouldings are surmounted by a *saptaratha. sikhara* of *bhumija* style showing five horizontal and five vertical rows of miniature shrine-models. The *sikhara* has lost some portion on the southern and northern sides and its crowning members are also missing. This temple, which is of *panchdyatana* variety, has only one subsidiary shrine on the north-west. This shrine with a *bhumija sikhara* consists on plan of a sanctum and an *antarala.* The sanctum of this shrine originally enshrined a *Siva-linga* as is evident from a socket in the centre.

The Undesvara Mahadeva temple at Bijolia (pl. XLB) dedicated to Siva is assignable to twelfth century. It follows the plan of the Siva temple at Ramgarh. The temple consists on plan of a *saptaratha* sanctum, an *antarala,* a *sabha-mandapa* with a central hall and three *mukha-mandapas,* of which only two lateral ones have been converted into small chambers. The temple, facing west, stands on a platform approached by a flight of steps on the western side. The sanctum is square and enshrines a *Siva.-linga* installed on *yonipatta.* The interior of the sanctum is plain with its ceiling of *nabhichchhanda* variety. It is decorated on the top with a full-blown lotus. The floor of the sanctum is lower than the floor of the *antarala,* and is approached by flight of eight descending steps. The sanctum-doorway is elaborately carved with seven *sakhas. A* four-armed Siva seated *in padmasana* occupies the *lalatabimba.Thc* ceiling. of the central hall of *the sabha-mandapa* rests on four pillars, one at each of the four comers. These pillars are similar in design and ornamentation. The ceiling is of *nabhichchhanda* variety and is decorated on the lower portion with eight brackets showing flying *bhutas* carrying different attributes such as sword and shield in their hands. The noteworthy feature of the central hall of the *sabha-mandapa* is that it has four *makara-toranas* of which the one on the eastern side is missing. The pillars of the central hall are carved with sculptures of *surasundaris,* bearded ascetics, Kubera, Bhairava, male drummers and Saivacharyas. The top of the ceiling of the *sabha-mandapa* is decorated with a full-blown lotus. The lateral *mukha-mandapas* of the *sabha-mandapa* contain a shrine chamber. The *mukha-mandapa* on the western side has a parapet wall on the northern and southern sides which is surmounted by *asanapatta.* The *kakshasana* above the

dsanapatta is missing. The ceiling of this *mukha-mandapa* is of *nabhichchhanda* variety and is supported by four dwarf pillars, similar in design and ornamentation to the other dwarf pillars of the southern and northern *mukha-mandapas.* At each of the four comers of the ceiling is carved a *kirttimukha* . The elevation of the sanctum from bottom upwards shows *pitha* mouldings which are identical to those in the *mukha-mandapas* upto *gajathara.* Above this, the sanctum comprises a plain *khura, karnika, kumbha* decorated on the top with lotus-petals, a median band of diamonds and rosettes and niches containing the images of seated deities, plain *antarapatra, kalasa* decorated with diamonds and rosettes, plain *antarapatra, kapota* embellished with *kudus* and *manchika* also decorated with typical arches of the Paramara style. These mouldings constitute the *adhishthana* and support the *jangha* carved with a single band of sculptures. The *bhadra-niches* on *the jangha* of the sanctum snow flying Garuda on the north, Brahma on the east and Vishnu on the south. It may be noted that besides the sculptures on the *bhadras* inside niches and on the projections, the recesses of the *jangha* contained pilaster designs surmounted by a shrine-motif and diamonds in panels. This feature is common with the Mamlesvara temple at Onkarmandhata in Madhya Pradesh. There are two-holes in the walls of the sanctum on either side of the three *bhadras* for admitting light and air. *The jangha* supports the *varandika* mouldings consisting of *kutachhadya* and a *kapota* decorated with *kudus.* Above the *varandika* rests the nine storied *sikhara* filled with nine horizontal and five vertical rows of miniture shrine models. The *mulamanjari* of the *saptaratha sikhara* is decorated with a mesh of *chaitya-axches* and shows at the bottom on all the four sides, a large *chaitya-dormer* crowned by a *kirttimukha* and an image of dancing Siva. Below the *chaitya-* dormers on all the four sides are shown niches with images of seated deities. The roof of the *sabha-mandapa* is of *samvarana* variety, marked *bykutag hantas.*

The Hajaresvara temple at Bijolia consists on plan of a *pancharatha* sanctum, an *antarala* and an *ardha-mandapa.* The temple is dedicated to Siva and its sanctum enshrines a *Siva-linga* carved with a thousand *lingas.* The interior of the sanctum is plain and its ceiling is that of *nabhichchhanda* type. The sanctum-doorway is decorated with five *sakhas.* The *lalatabimba* comprises a two-armed Lakulisa seated in *padmasana,* carrying *bijapuraka* and *lakuta.* The walls of the *antarala* are plain with its flat ceiling which rests on two pilasters. There are five full-blown lotuses to decorate the ceiling. Inside the *ardha-mandapa* is found a loose image of seated Nandi. The ceiling of the *ardha-mandapa* rests on two pillars and two pilasters. The ceiling of the sanctum is of *bhubanesvari* type marked by two intersecting squares. The ceiling is carved with a full-blown lotus in the centre and *shows a bold kirttimukha* at each of its four comers. The elevation of the temple from bottom upwards shows *pitha* mouldings consisting of *a plain bhitta, Jadyakumbha, karnika* and a *grasapattika*. Above *the pitha* mouldings rest the *adhishthana* mouldings consisting of a plain *khura, karnika, kumbha* carved with a median band of diamonds and rosettes and niches exhibiting images of seated deities and lotus-petals carved on the top, *kalasa* with a band of diamonds and rosettes and *kapota* engraved with *kudus.* The *adhishthana* mouldings support the *jangha* having two median bands, one showing *chaitya-* arches of the typical Paramara style while the other that of *kirttimukhas*

Aknough no sculptures are found on the *anurathas* and *karnarathas,* the niches on the *bhadras* of the sanctum show dancing Siva on the south, Vishnu seated in *lalitasana* on the west and Brahma also seated in *lalitasana* on the north. The images of ten-armed Bhairava also appear in southern and northern walls of the sanctum respectively. The *varandika* mouldings above *thejangha* consist of a *kutachhadya* and *kapota* decorated with *kudus.* These mouldings support the *pancharatha sikhara* having two vertical and three horizontal rows of miniature shrine-models on the *karnarathas,* and a single row of *urusringas* on the central *ratha* on the second or middle *urusringa* is shown a large *chaitya-dormex* containing an image of Siva mostly dancing, on all the four sides. There is a row of sculptures on the lower portion of the *sikhara* showing Brahma, Vishnu, Siva and several other deities. The *sikhara* is crowned by *griva, amalaka, kalasa* and *bijapuraka.* While the roof of the *antarala* is surmounted by a rampant lion, the *ardhamandapa* has a flat roof with a parapet' wall running around above the *kutachhadya.* It is decorated with merlons. This beautiful temple of twelfth century AD shares many features of a *bhumija* temple and is marked by a special feature showing introduction of two miniature shrine models at either ends of the roof of *antarala.*

The Adbhutanatha temple at Chittaurgarh, dedicated to Siva is built of white sandstone (pLXLIA). It consists on plan *of & pancharatha* sanctum, an *antarala,* a *sabha-mandapa* and three *mukha-mandapas,* one each on the northern, southern and western sides. The interior of the sanctum is plain and its ceiling is of *nabhichchhanda* variety. The sanctum enshrines a Siva-/mga installed on a *yoni-patta.* There is a niche in the eastern wall of the sanctum containing a modern image of standing Parvati. Above this niche on the eastern wall is seen a beautiful image of six-armed and three-headed Mahesamurti carrying *abhayaksha,* dagger, indistinct object, *kapala, sarpa* and *matulunga.* Siva wears *jatamukutas* on the central and right heads and matted hairlocks tied by a garland of skulls on the left head. The sanctum-doorway is elaborately carved with five *sakhas. A* four-armed Ganesa in *lalitasana* appears on the *lalaiabimba.* The walls of the *antarala* are plain with two niches which are lying vacant at present, one on the southern and the other on the northern walls. The collapsed ceiling of the *sabha-mandapa* now completely missing, was supported on eight pillars, arranged in the form of an octagon. All these pillars are almost similar in design and ornamentation. The extant portion of the ceiling on the eastern side, indicates that it was of *nabhichchhanda* variety. Each of the lateral *mukha-mandapas* has an *antarala* with plain walls, a flat ceiling decorated with full-blown lotuses and the doorways carved with five *sakhas.* The main *mukha-mandapa* which is on the western or front side has an elaborate doorway decorated with five *sakhas.* It is approached by a flight of seven steps on the west. The elevation of the temple exhibits from bottom upwards *pitha* mouldings consisting of a plain *bhitta* surmounted by another *bhitta* marked by half-diamond design, *apattika* carved with half-garland loops, *jadyakumbha, karnika,* plain *antarpatra, kapota* decorated with *kudus* and a *grasapattika.* Above this rest the *adhishthana* mouldings comprising a plain *khura, kumbha* adorned with a median band of diamond and rosettes and a niche on the *bhadra* containing an image of a seated deity, plain *kalasa* and *antarpatra* and *kapota* showing a frieze of diamonds in panels and *kudus.* The *adhishthana* mouldings support the

jangha which is embellished with a single band of sculptures and is surmounted by *varandika* mouldings. These *varandika* mouldings consist of a *kutachhddya* supported by brackets and *karnika, padma* and *kapota.* Above this rests the *sikhara* of *bhumija* style having four spines, each carved with two *urusringas* on each of the four sides. Each of the two *urusringas* has a niche with an image of a deity and is also decorated with usual mesh of *chaitya-dormers.* The quadrants in-between the spines are filled with miniature shrine models of diminishing heights arranged in three horizontal and three vertical rows. However, this temple does not have a prominent *sukanasika* exhibiting a sculptural medallion within a conspicuous dormer at the base of spine on each side. Among the sculptures shown on the *jangha* of this temple, the icons of standing and dancing *surasundaris, dikpalas,* Saiva ascetics, *vyalas,* dancing Chamunda, Nataraja, Andhakantaka Siva, Agni and Svaha and Yama and Yami are noteworthy. The three niche in the *bhadras* of the sanctum on the *kumbha* moulding of the *adhishthana* contain an image each of a seated *devi.* The niches on the *urusringas* of the *sikhara* above the sanctum contain images of seated and dancing Siva besides an image of dancing Bhairava.

The Adbhutanatha temple represents a late regional version of *bhumija* style and is an important temple of late fifteenth century .

The Samidhesvara temple at Chittaurgarh consists on plan of a *pancharatha* sanctum, an *antarala,* a *sabha-mandapa* and three *mukha-mandapas* two on either side and one in front (pi. XLIB). The temple was built byParamara king Bhoja in the eleventh century and later repaired by Maharana Mokala in 1428. The temple dedicated to Siva has an image of three-headed Mahesamurti, fixed-in the western wall of the sanctum. The ceiling of the sanctum is *oinabhichchhanda* variety and consists of seven bands of concentric overlapping circles. The top of the ceiling is decorated with a full-blown lotus. The sanctum-doorway is composed of five *sakhas.* The walls and ceiling of the *antarala* are plain and its flat ceiling rests on four richly carved pillars. The *sabha-mandapa* has a central hall, the ceiling of which rests on four tall pillars. Of these, two pillars on the eastern side are richly ornamented. The ceiling of the central hall is of *nabhichchhanda* variety and consists of seven bands of concentric overlapping circles carved with *kola* and *gajatalu* courses. The lower portion of the ceiling is carved with twelve brackets some of which show flying *bhutas* playing on musical instruments. This feature of the ceiling is found in the ceiling of the Siva temple at Bhojpur, district Raisen in Madhya Pradesh, also built by Paramara king Bhoja. The ceiling of the *sabha-mandapa* rests on twelve pillars and eighteen prop-pillars which were provided during time of Maharana Mokala. The doorways of the northern and southern *mukha-mandapas* are carved with three *sakhas* each "However, the lintels of both the doorways differ in details of ornamentation and sculptural representation. The ceilings of both the *mukha-mandapas* are suppported by two pilasters and two pillars. The western *mukha-mandapa* resembles the northern and southern *mukha-mandapas* in architectural design and ornamentation.The elevation of the temple shows from bottom upwards, *pitha* and *adhishthana* mouldings which support the *jangha,* decorated with a single band of sculptures and a niche-shrine on each of the three *bhadras.* Above the *jangha* rest

the *varandika* mouldings and the *pancharatha-sikhara* clustered by four *urusringas* and two rows of *karnasringas.* The *sikhara* is crowned by *griva, amalaka, chandrika, kalasa* and *bijapuraka*. The sculptures on *the jangha* show surasundaris in various postures, Sarasvati, Saiva ascetics, Siva and *dikpalas,* Ambika and Chakresvari Yakshis. Among the sculptures carved on the pediments of *sabha-mandapa,* those of Gajalakshmi, Sarasvati, Chamunda, Brahma, Vishnu and Mahesa are noteworthy. The roofs of the *sabha-mandapa* and also the three *mukha-mandapas* are of *samvarana* variety. These are decorated with *kutaghantas* surmounted by *griva, amalaka, chandrika, kalasa* and *bijapuraka*. In front of the temple there is a Nandi *mandapa.*

The Sun temple at Ranakpur, district Pali, Rajasthan is a *bhumija* temple, assignable to fifteenth century. It is a late regional version of *bhumija* style showing a unique plan and design. Its sanctum and *sabha-mandapa* are polygonal. The temple is star-shaped on plan comprising a sanctum, an *antarala,* a *sabha-mandapa* and an *ardha-mandapa.* The elevation of the temple shows from bottom upwards, pitha mouldings consisting of *a bhitta,* another *bhitta* decorated with half-diamond design, *jadyakumbha, karnika,* plain *antarpatra, kapota* decorated with *kudus* and *agrasapattika. The pitha* mouldings support the *adhishthana* mouldings consisting of a plain *khura, kumbha* decorated with a median band of diamonds and rosettes and half-diamond designs, *ratnakalasa* carved with diamonds and jewels and two *kapotas* both adorned with *kudus.* Above this rests *the jangha* which exhibits only one band of sculptures of solar deities. *The jangha* supports the *adhishthana* mouldings marked by a *double padma, kapota* decorated with *kudus* and *a khura-chhadya.* Above this rests the *sikhara* having four spines carved with the usual mesh of *chaitya-dormers* and three *urusringas.* The four quadrants in-between the spines are filled with miniature shrine models showing three vertical and twelve horizontal rows. The spines approach beyond *griva* and each of them is decorated with a head on the top. The *sikhara* is crowned by *griva, amalaka, chandrika, kalasa* and *bijapuraka.* The sanctum enshrines two marble images of which the main image is that of Surya while the other one is that of a *devi.* The walls of the sanctum are plain with its ceiling of *nabhichchhanda* variety showing five bands of concentric overlapping circles crowned by a lotus *with padmakesara.* The ceiling contains leaf design instead of *kola* and *gajatalu* courses. The sanctum doorway has four *sakhas,* having in its lower portion standing figures of three female and two male attendants. The *lalatabimba* shows a niche containing an image of four-armed seated Ganesa. The southern wall of *antarala* exhibits an image of three-headed and eight-armed Vishnu while its northern wall depicts an image of four-armed Vaishnavi seated on Garuda. The ceiling of the *antarala* has a circular medallion carved with a frieze of *vyalas* and another frieze of flying *Gandharvas* on musical instruments. The circular medallion is flanked on either side by two full-blown lotuses. The ceiling of the *sabha-mandapa* is of the *nabhichchhanda* variety and consists of eight bands of concentric overlapping circles. The top of the ceiling is having a triple lotus from which *&padmakesara* is seen hanging. The *ardha-mandapa* is approached by a flight of five steps on the eastern side. Among the sculptures noticed on the *jangha* mention may be made of India,. Agni, Yama, Nirriti, Isana, Bhairava, Vanma, Vayu, Hariharahiiwagaibha

Vaishnavi, Naga, Kubera, Surya-Narayana, Ganesa and Siva.

The Mahavira temple at Sewari in district Pali, Rajasthan, consists on plan of a *pancharatha* sanctum, an *antarala,* a *gudha-mandapa* and an open *mandapa.* In front of the open *mandapa* there is a *sabha-mandapa.* The elevation *shows pitha* mouldings consisting of plain *bhitta ,jadyakumbha* and *karnika.* Above this rest the *adhishthana* mouldings indicating plain *khura, kumbha* marked by half-diamond design, plain *kalasa* and *kapota* decorated with *kudus*. The *adhishthana* mouldings support the plain *jangha,* showing a niche-shrine with an image of a seated Jina on the southern, northern and western *bhadras.* The *jangha* supports the *varandika* mouldings consisting of *a kapota* decorated with *kudus.* Above this rests the *sikhara* of *bhumija* style showing four spines, one on each *bhadra.* The spines are adorned with usual mesh of chaitya-dormers. The four quadrants in-between the spines are with miniature shrine models of diminishing heights, arranged in six horizontal and three vertical rows. There is a prominent *sukanasa* showing a medallion within a chaitya-dormer at the base of the spine on each side. This medallion does not, however, contain any sculpture. It is significant to mention here that while the *pitha, adhishthana, jangha and varandika* mouldings of this temple are of stone, the *sikhara* is made of bricks. It is crowned by *griva, amalaka, kalasa* and *bijapuraka.* The sanctum enshrines at present an image of Santinatha. This image has been substituted in place of the original image of Mahavira. The sanctum -doorway is composed of three *sakhas.* A Jaina trithankara seated *padmasana* in *dhyanamudra* occupies the *lalatabimba.* Above the sanctum-doorway are shown five niches and four recesses, each provided with an image of a Jaina deity. The walls and the ceiling of the *antarala* are plain. The extant niche in the southern and northern walls of the *antarala* at present contain modem Jaina images of brass. The ceiling of the *antarala* is flat arid plain and rests on two plain pilasters. The *gudha-mandapa* enshrines a number of white marble images of Jaina Tirthankaras. The open *mandapa* has a flat and plain ceiling, divided into six compartments by two horizontal and four vertical rows of pillars. The *gudhamandapa* entered through a doorway on the east is decorated with three *sakhas.* The *lalatabimba* again shows a seated image of Jaina tirthankara. On either side of the doorway is a niche-shrine containing an image of a Jaina deity .The ceiling of the *sabha-mandapa* is of *nabhichchhanda* variety being supported by eight pillars. The temple stands inside a courtyard. On its periphery are arranged fifty-two *devakulikas,* each containing a marble image of Jaina tirthankara, seated in *padmasana* in *dhyana-mudra*. Each *devakulika* has a *sikhara* above it. The roof of the *antarala* is of gable-end variety showing on the eastern side a medallion inside a large *chaitya-* dormer. The medallion is vacant at present showing a seated lion in front. The roofs of the *gudha-mandapa* and open *mandapa* are flat while the roof of *sabha-mandapa* is domical. The southern and northern facades of the *gudhamandapa* show each, two sculptures on *the jangha* portion. The sculptures carved on the southern facade depict a standing *kshetrapala* and a female attendant while the sculptures of a standing *devi* and a bearded male ascetic appear on the northern facade. The main entrance to the courtyard of the temple is on the eastern side and is decorated with three *sakhas.* The inscriptions on three pillars of the open *mandapa* assign the temple to the twelfth century.

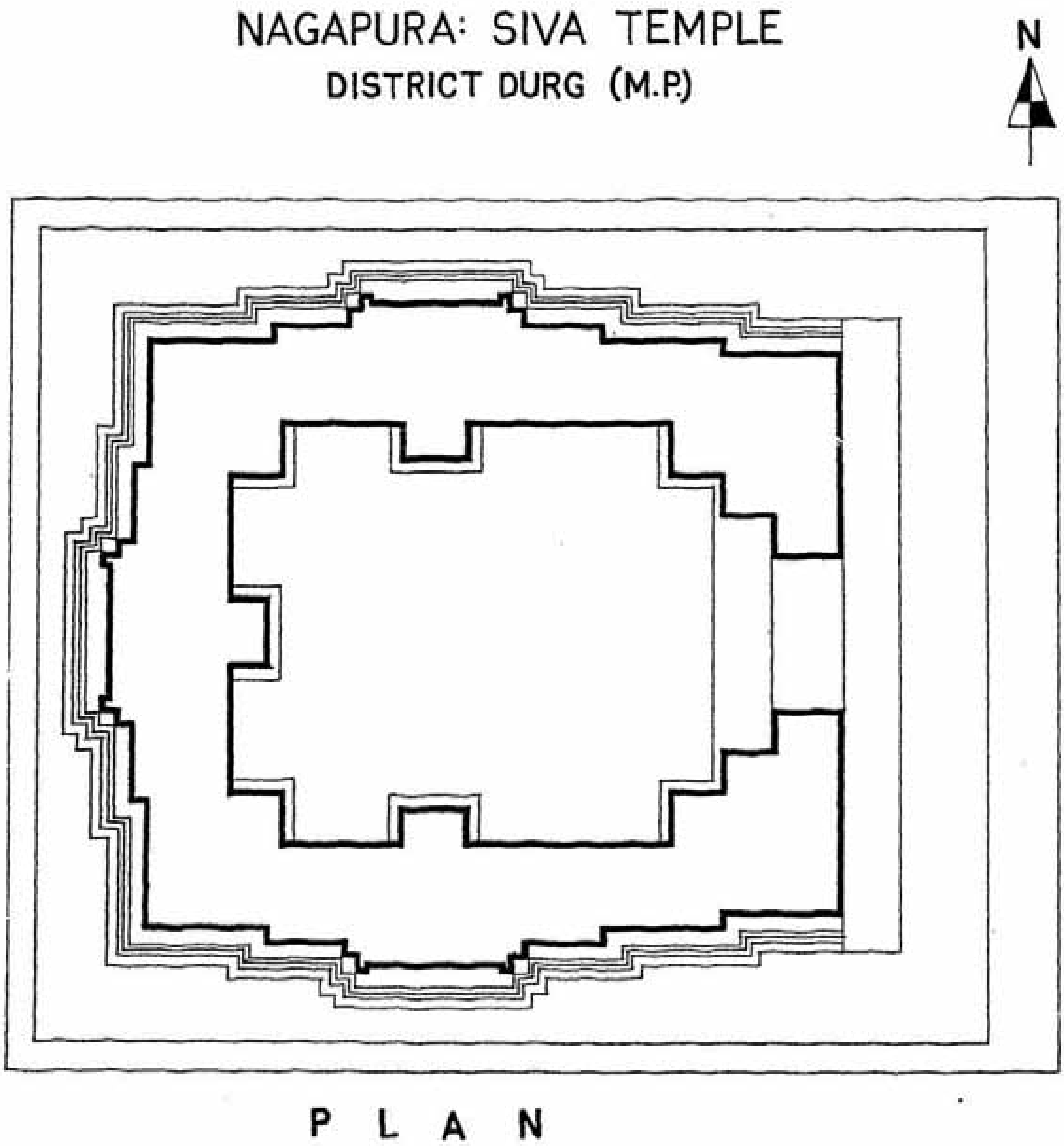


Fig. 7

Besides the above, ruins of temples at Chandravati in district Sirohi, Rajasthan, were also surveyed. Chandravati, was the capital of Abu Branch of Paramaras and was an extensive city of temples. At present, only the plinths of some temples have survive. A number of images adorn these temples most of which have been collected and preserved in the archaeological museum at Mount Abu. The temples are in ruins beyond any identification. Some of the temple are of *panchayatana* variety. Among the images recovered from Chandravati, those of Saiva, Vaishnava, Sakta, Saura and Ganapatya cults and Jaina pantheon are most prominent. The images found at the site include Ganesa, Karttikeya, Indra, Chamunda, Lakshmi-Narayana, Uma Mahesvara, Bhairava, Kubera, Brahma and Surasundaris. There are ruins of at least thirty-three temples at Chandravati.

Apart from these, the Sjva temple at Nagpura .in district Durg was also visited for comparative study of Paramara temples with Kalachuri temples. The temple, assignable to twelfth century, on plan consists of *a pancharatha* sanctum and an *antarala* (fig.7). The walls of the sanctum are plain with its ceiling of *nabbhichchhanda* variety. The sanctum-doorway is decorated with four *sakhas* and its lintel shows on the *lalatabimba* a four-armed Siva seated in *lalitasana* and carrying *abhaya, trisula, sarpa* and *matulunga.* The elevation of the temple shows *pitha* and *adhishthana* mouldings which support the *jangha,* divided into two compartments by a median band decorated with *kirtimukhas* and geese. Noteworthy sculptures carved on the *jangha* include icons of Ganesa, Nataraja, Surya, Chamunda, Brahmi, Brahma and Hariharahiranyagarbha. Above *the jangha* rest the *varandika* mouldings which support the *pancharatha sikhara.*

In addition to the above, following temples were also surveyed, viz., Siva temple at Kedamath, — Gauri Mai temple at Gaurikunda, the Triyugi Narayana temple at Triyugi Narayana near Sonprayaga, Nala-amayanti or Lalita Mai temple at Nala, group of temples at Narayanakoti, Aniruddha temple at Lamgaundi, group of temples at Dewali Bhanigram, group of temples at Phali Phasalat, the Durga Mata and group of temples at Phegu, Visvanatha temple, at Guptakashi, the Chandrasekhara Mahadeva temple at Phalai, group of temples at Agastyamumi, group of temples at Shilla, the Rudranatha temple at Rudraprayag, the Siva and Chandi temples at Hat, all in district Chamoli, Uttar Pradesh.

The Siva temple at Kedamath stands in an enclosure wall on a spacious. platform and on plan consists of a *pancharatha* sanctum, an *antarala* and *asabha-mandapa* provided with two doorways, the main one on the southern side while the other one on the eastern side (pl. XLIIA). The elevation of the temple shows from bottom upwards *pitha* mouldings consisting of two plain *bhittas* and *adhishthana* mouldings comprising a plain *khura, kumbha,* decorated with a median band of diamonds and rosettes, plain *kalasa, antarpatra* and *kapota.* above the *adhishthana* mouldings rests the *jangha,* decorated with a bold band of rosettes in the middle portion and a frieze of rosetters on the upper portion. The *jangha* supports the *varandika* mouldings consisting of a plain *padma kapota* and a *karnika.* Above this rests the *pancharatha sikhara* having a frieze of lotuses at the base. The seven-storeyed *sikhara.* composed of six *bhumi-amalakas* is surmounted by *chhatra, kalasa* and

bijapuraka. The roof of the antarala is of gable-end variety and is surmounted by an open pavilion with an image of seated lion. The *sabha-mandapa* has two doorways, one on the east and the other on the south. Both these doorways are decorated with five *sakhas.* On the eastern flank of the southern doorway are carved seven out of ten incarnations of Vishnu. The ceiling of the *sabha-mandapa* is flat and divided into eight compartments. The ceiling of the central hall of *sabha-mandapa* is, however, supported by four pillars and is adorned with a full-blown lotus on the top. The interior facades of the *sabha-mandqpa* show eight niches, two in each wall, in which occur images of male devotees, Yudhishthira, Nakula and Siva . The niche on the eastern side of the southern wall contains an image of a Saivacharya which is locally known as depicting Arjuna. A shrine in the western wall of the *sabha-mandapa* enshrines an image of standing Lakshmi-Narayana. The sanctum-doorway has nine *sakhas* the lintel of which shows on the *lalatabimba* niche containing an image of four-armed Ganesa seated in *lalitasana* and flanked on either side by a female attendant standing in *tribhanga*. The walls of the sanctum are plain, each having a niche on the western, northern and southern sides. There is a *Siva-Iinga* in the centre of the sanctum considered as one of the twelve *jyotirlingas.The* niche in the western wall of the sanctum enshrines *yoni-patta* while the niches in the northern and southern walls enshrine seated Uma-Mahesvara and a Siva-/mga installed on a *yoni-patta* respectively. The ceiling of the sanctum consists of seven receding tiers of octagons. The walls of the *antarala* are plain except for two niches showing images of seated Ganesa and standing Parvati.In front of the *antarala,* an image of seated Nandi is placed on a pedestal. The main temple, in its present form, is assignable to twelfth century.

The Gauri Mai temple at Gauri Kunda is dedicated to Gauri. On plan, the temple consists of a sanctum and a *mandapa* with two doorways, one on the eastern and the other on the southern side. The walls and the doorway of the sanctum are plain. Inside the sanctum are kept at present the images of standing Annapurna, seated Uma-Mahesvara and standing Lakshmi-Narayana. This sacred site is regarded as a place where Gauri performed penance to get Siva as her husband.

The Triyugi Narayana temple near Sonaprayag dedicated to Vishnu, consists of a *tri-ratha* sanctum,an *antarala* and a *sabha-mandapa* on plan. The sanctum is comparatively dark as it does not have any window. Inside the sanctum are kept a number of metal images of Vishnu. In the centre of the *sabha-mandapa* is a yajnakunda with sacred fire. The *sabha-mandapa* is provided with three doorways, one each on the eastern, northern and southern sides. The ceiling *of the sabha-mandapa* is made of wooden planks and beams. There is a chimney in the centre of the ceiling of *sabha-mandapa* for the outlet of the smoke. The interior as well as the doorway of the sanctum are plain. The ceiling of the sanctum is flat, carved with a full-blown lotus. The sanctum has a pedestal attached to its rear wall on which are placed images of Rama and Parsvanatha. On the platform in the centre of the sancutm are installed images of Lakshmi, Lakshmi-Narayana and Sarasvati. Among the other stone images inside the sanctum the icons of Uma-Mahesvara, Lakshmi-Narayana, Harihara and Ganesa, all assignable to ninth century are noteworthy. The elevation of the temple shows from bottom upwards a plain *kumbha, kalasa, kapota* decorated with *kudus* and a plain *pattika.* They

comprise the *adhishthana* mouldings and are surmounted by plain *jangha,* which supports the *varandika* mouldings. Above this rests the *triratha sikhara* marked by a frieze of lotuses in the lower portion and is divided into five storeys by the *bhumi-amalakas.* The *sikhara* is crowned by *griva, amalaka, chhatra, kalasa* and *bijapuraka.* The roof of the *antarala* is of gable-end variety and is crowned by a wooden pavilion comprising a stone image of flying Garuda. The roof of the *sabha-mandapa* is made of sloping stone slabs for easy draining out of rain water. On the east of the temple exist three other temples, out of which, two consist of a sanctum and an *ardha-mandapa,* while the third one has only a sanctum. The first two temples have a *rekha sikhara* above the sanctum but the last one shows *a pidha sikhara.* The main temple of Triyugi Narayana is assignable to tenth century while the remaining three temples are earlier, assignable to ninth century.

The village Nala has five temples, with the main temple dedicated to goddess Lalita, the other one is dedicated to Siva. The remaining three temples are, however, devoid of any image inside due to which it is not possible to ascertain their dedication. The Lalita temple consists of a *tri-ratha* sanctum, an *antarala* and a *sabha-mandapa* on plan. The sanctum enshirnes an image of Siva-Parvati standing in *tribhanga.* The walls of the sanctum are plain. From the exposed portion of the flat ceiling of the sanctum, it is seen that the *sikhara* above it is hollow. While the sanctum and the *antarala* are in their original form, the *sabha-mandapa* has been renovated in recent times. In the centre of the *sabha-mandapa* is another *mandapa* -the ceiling of which rests on four pillars. The *sabha-mandapa* is provided with three doorways, one each on the western, northern and southern sides. The ceiling of the *sabha-mandapa* is plain and flat. In elevation, the sanctum shows , from bottom upwards, *adhishthana* mouldings consisting of plain *khura, kumbha, kalasa* and *kapota* decorated with *kudus,* the plain *jangha* showing a nich on the southern, western and northern *bhadras,* the *varandika* mouldings and the *tri-ratha sikhara* being divided into four storeys by means of three *bhumi-amalakas.* The *sikhara* supports *chhatra, kalasa and bijapurka.* The *sabha-mandapa* has a sloping roof of slanting stone slabs, while the *antarala has &* roof of gable-end variety. Inside the *sabha-mandapa* are kept some fragmentary sculptures among which an image of Harihara standing in *samapada* is noteworthy. There are three other temples located on the south of the Lalita temple. The temple on the south-east comer consists on plan *of z. tri-ratha* sanctum and an *antarala.* The lintel of the sanctum-doorway shows four-armed Ganesa seated in lalitasana inside a niche on the *lalatabimba.* Above this lintel is noticed another black stone slab carved with an inscription in Sanskrit language and proto-Devanagari characters and dated VS 1168 i.e., ADI 111. The inscription records the construction of the temple during that period. The second temple consists of a *tri-ratha* sanctum and an *ardha-mandapa.* Its sanctum -doorway is in a dilapidated condition. The ceilings of the sanctum and the *ardha-mandapa* are plain. The third one consists of a sanctum alone and enshrines a *Siva-linga.*

The group of temples at Narayanakoti has nineteen temples of which the main temple is dedicated to Lakshmi-Narayana. It consists of a sanctum, an *antarala* and an *ardha-mandapa* on plan. The sanctum doorway has three plain *sakhas* and the lintel of the doorway shows four-armed

seated Ganesa on the *lalatabimba.* The ceiling of the *ardha-mandapa* is plain and flat, supported by two pillars and two pilasters. The temple is of *panchayatana* variety and shows four smaller shrines, one each at the four comers, around the central shrine. These shrines consist of a sanctum and an *ardha-mandapa* on plan and in elevation *adhishthana* mouldings, *jangha, varandika* and a *tri-ratha sikhara* divided into four storeys by means of *theebhumi-amalakas.* The *sikhara* is crowned by *griva* and *amalaka.* All the four subsidiary shrines at present are without an image. The main temple of Lakshmi-Narayana stands on a platform approached by a flight six steps on the east. The elevation of the temple shows *adhishthana* mouldings consisting of plain *khura, kumbha, kalasa, kapota* decorated with *kudus, jangha* having a plain band on the top, *varandika* and a *tri-ratha sikhara* divided into six storeys by five *bhumi-amalakas.* The other eighteen temples of this group are also made of stone ashlar masonry and on plan each consists of a sanctum and an *ardha-mandapa.* Some of these temples belong to Vaishnava, Saiva and Sakta pantheons. These temples follow the Pratihara style of architecture and resemble the Pratihara group of temples at Naresar in Morena district of Madhya Pradesh and are assignable to ninth-tenth centuries. To the north of the Lakshmi-Narayana group of temples is another group of five temples which also follows the same style of architecture and is assignable to ninth-tenth centuries. Each temple on plan consists of a sanctum and an *ardha-mandapa.ytfMie* two out of five temples have *pidha sikharas* above their sanctums, two temples exhibit rekha *sikharas.* These temples are arranged in two rows. While the front row has two temples, dedicated to Satyanarayana and to Virabhadra Siva with a Siva-/mga installed on a *yoni-patta,* in the back row there are three temples with vacant sanctum. These temples resemble in style the Teli-ka-Mandir at Gwalior.

The Aniruddha temple at Lamgaundi is built of stone ashlar masonry and on plan consists of a *tri-ratha* sanctum and an *antarala.* The sanctum, which enshrines an image of four-armed Vishnu standing in *samapada* carrying *padma, gada, chakra* and *sankha* has plain walls. There is a niche in the western wall of the sanctum which is now" vacant. The ceiling of the sanctum is flat, decorated in the centre with a full-blown lotus. The sanctum-doorway has three *sakhas,* the first one is carved with lotus-creeper, the second with a chain-and-bell design and the third shows a *naga-sakha.* The presence of *naga-sakha* also indicates the temple to be of the Pratihara period. All the three *sakhas* have been carried over the lintel which shows a seated four-armed Ganesa on the *lalatabimba.*

The northern and southern walls of the *antarala* each have a niche containing an image of a deity. While the niche of the southern wall displays a four-armed Sarasvati, standing in *tribhanga,* playing *vina,* the image in the niche of the northern wall has been chopped off. The ceiling of the *antarala* is plain and flat The elevation of the temple shows from bottom upwards, *adhishthana* mouldings consisting of *khura, kumbha,* decorated with a band of diamonds and rosettes, *kalasa* and *kapota* carved with *kudus.* The *adhishthana* mouldings support *the jangha* which is having a niche on each of the three *bhadras.* The images of two-armed flying Garuda, eight-armed dancing Siva and a two-armed male deity standing in *samapada* occur in the southern, western and northern *bhadras* respectively. The *jangha* is adorned with five bands and supports the *varandika* mouldings above

which rests the sloping roof, made of slanting stone slabs. Significantly, this temple is without a *sikhara* above the sanctum. The temple is assignable to ninth century and is supposedly a landmark among the Pratihara temples reported in this region.

The Panchavaktra Mahadeva group of temples at Devali Bhanigram consists of seven temples, of which the Panchavaktra Mahadeva temple is the largest and well known. The temple on plan consists of a *tri-ratha* sanctum, an *antarala* and a *sabha-mandapa.* The sanctum, enshrines a mutilated *Siva-linga* installed on a *yoni-patta.* The ceiling of the sanctum is of *nabhichchhanda* veriety and is deorated with a full-blown lotus on the top. The walls of the *antarala* are plain and its ceiling is also plain and flat. The *sabha-mandapa* has plain walls with an entrance-doorway on the west. Noteworthy among the loose sculptures inside the *sabha-mandapa* is of a Royal Donor couple. A Sanskrit inscription in Devanagari characters inscribed on the pedestal of the image mentions a date VS 1340i.e., AD 1283. In the centre of \h& *sabha-mandapa* is *ayajnakunda* showing its ceiling, made of wooden planks and beams. The sanctum on elevation shows from bottom *upwards pitha* mouldings consisting of plain *kharasila,* two plain *bhittasjadya kunbha* and *karnika.* Above the *pitha* mouldings rest the *adhishthana* mouldings comprising plain *kumbha, antarpatra* and *kalasa.* Above this, rests the *jangha.* It is divided into two segments. The *varandika* mouldings which support the *tri-ratha sikhara* is decorated with a frieze of diamonds and rosettes at the bottom and a fragmentary head of a deity on the top of the *bhadra.* The *sikhara* supports a wooden *chhatra* crowned by *kalasa* and *bijapuraka.* The roof of the *antarala* is of gable-end variety. The *sabha-mdndapa* seems to be a later addition as the material used for its construction is different from the material used for the sanctum and *antarala.* In front, there exists a group of six temples much smaller in size and belonging to Pratihara period, slightly earlier in date than the one described above. Of these temples, three consist of a sanctum and an *ardha-mandapa* on plan while the other three have only a sanctum. The sanctum of one of these temples enshrines an image of Lakshmi-Narayana, mounted on Garuda. The sanctum of the other temple enshrines a Siva-linga installed on a *yoni-patta.* All these temples are built of white stone ashlar masonry and are coeval in date with the group of temples at Naresar in district Morena, Madhya Pradesh.

The Phali-Phalasat group of Siva temples comprises four temples, built in white stone ashlar masonry and are assingable to ninth century. They have a simple plan showing a sanctum with a small porch in front. These temples form an important group of Pratihara temples in this region.

The Durga Mata temple at Phegu is dedicated to goddess Durga and on plan consists of a sanctum, an *antarala* and a *sabha-mandapa.* The sanctum enshrines an image of standing eight-armed Durga. The sanctum is crowned by a *sikhara* surmounted by *amalaka, chandrika, kalasa* and *bijapuraka.* In its present form the temple is assignable to fifteenth century. The presence of Ganesa, Durga riding on lion and Nandi images inside the *sabha-mandapa,* however indicates the existence of a temple aj the site. To the east of *sabha-mandapa* is another temple dedicated to Siva which consists on plan of a sanctum and a *sabha-mandapa.*

To the south of Durga Mata temple stands another temple on a platform left unfinished, On plan.

the temple consists of a *pancharatha* sanctum, an *antarala,* a *sabha-mandapa* and an *ardha-mandapa.* But only the walls of the sanctum have survived. The *sabha-mandapa* and the *ardha-mandapa* were not built perhaps due to some unknown calamity. The temple, of white stone ashlar masonry is assignable to eleventh century. The sanctum has elaborate *pitha* mouldings consisting of a plain *bhitta, jadyakumbha, karnika* and *kapota.* The *pitha* mouldings support of plain *khura, kumbha* are adorned with niches having images of seated *devis, kalasa* and *kapota.* Above this rests *the jangha* which is decorated with a single row of sculptures showing *apsarases* in various postures such as dancing, playing on *vina* and writing letters. Only the northern portion of *jangha* has survived. The *ardha-mandapa* and *sabha-mandapa* have only *pitha* mouldings.

To the north of this temple stands another Siva temple, consisting of a sanctum and an *antarala* on plan. The *sikhara* above the sanctum of this temple is of *pidha* variety and consists of eight horizontal receding pidhas surmounted by *amalaka, kalasa* and *bijapuraka.* The roof of the *antarala* is of *sala sikhara* type like that of the Teli-ka- Mandir at Gwalior and the Vaital-Deul temple at Bhubaneswar. The temple, an example of Pratihara temple architecture, belongs to ninth century.

The Visvanatha temple at Gupta Kashi is dedicated to Siva and consists on plan of a sanctum an *antarala* and a *sabha-mandapa.* In elevation, the sanctum shows from bottom upwards a plain *bhitta, jadyakumbha* and *karnika.* The *pitha* supports the *adhishthana* mouldings consisting of a plain *kumbha, antarpatra, kalasa, antarpatra and kapota* decorated *with kudus.* Above the *adhishthana* mouldings rests the *jangha* which is plain and supports the *varandika* mouldings filled with *karnika* and *padma.* The *varandika* mouldings support the *tri-ratha sikhara,* arranged in five storeys being made of four *bhumi-amalakas.* Above the *sikhara,* there is a human head carved on the *bhadra* portion on each of the four sides which supports the wooden *chhatra,* crowned by double *kalasa* and *bijapuraka.* The sanctum enshrines a Siva-/mga installed on a *yoni-patta..* While the niche in ihe eastern wall of the sanctum contains an image of four-armed Parvati, standing in *samapada,* the niches in the southern and northern walls of the sanctum are lying vacant. The sanctum-doorway is plain and has four *sakhas.* The *antarala* has plain wall with a lotus carved in its ceiling. Of the two niches in the eastern wall of the *sabha-mandapa* one exhibits an image of seated Ganesa. The *sabha-mandapa* is provided with two doorways, one on the western and the other on the northern sides. The roof of the *antarala* is of gable-end variety and supports a pavilion containing an image of seated lion with mouth wide open. In front of the temple is *yajnasala* and a *kunda* having two streams known as Ganga and Yamuna.

Another temple, dedicated to *Ardhanarisvara* is on the south of Visvanatha temple. It consists of a sanctum and a *sabha-mandapa* on plan, inside an enclosure. This temple is assignable to eighteenth century.

The Chandrasekhara Mahadeva temple at Phalai stands on the site of a Gupta temple as is evident from the sculptures and architectural fragments found scattered here. The existing temple is of modem times comprising only a sanctum and an *ardha-mandapa.* The sanctum enshrines an

ekamukhi Siva-linga of the Gupta period. Among the other sculptures noticed here mention may be made of a Saiva-gana seated with his consort, four-armed Siva standing in *samapada* and a pediment of *chaitya-arches* showing an image of two -armed Lakulisa seated in *padmasana,* all datable to the Gupta period.

The group of temples at Shilla, assignable to ninth century, are almost similar in architectural and sculptural styles to the group of Pratihara temples at Naresar in Morena, Madhya Pradesh. This group of temples is located inside a spacious courtyard and possesses ten temples. Besides, there are two other temples, one dedicated to Siva while the other dedicated to Sanesvara, the god of wealth. The ruins of some other temples are also found scattered at the site. All these temples are built of white stone ashlar masonry and on plan consist of a *tri-ratha* sanctum, an *antarala* and a *mandapa.* Standing on a platform the elevation of these temples shows from bottom upwards *adhishthana* mouldings consisting of *khura,* decorated with half-lotus design, plain *kumbha, kalasa, kapota* carved with *kudus* and a plain *jangha* marked by a median band showing diamonds and rosettes. The *jangha* supports the *varandika* mouldings comprising a *kapota* and a plain *pattika.* Above the *varandika* rests the *sikhara* which is divided into six storeys made of five *bhumi-amalakas.* The *sikhara* is surmounted by *griva, amalaka, chandrika, kalasa* and *bijapuraka.* The roof of the *antarala* is of gable-end variety and is devoid of ornamentation. These temples are mostly dedicated to Siva, with a few exceptions which are dedicated to four-armed Vaishnavi seated on Garuda, carrying *gada* and *chakra* by her upper two hands. She holds a child by her lower right hand and a *sankha* by her lower left hand (pl.. XLIIB). An image of *dasavatara* Vishnu, standing in *samapada* and carrying *padma, gada, chakra* and *sankha* also deserves mention here. Both these images are assignable to ninth century.

Besides, the Jaina cave temples in the Marimata and Urwahi gate groups at Gwalior fort, hewn out of the rock in the fifteenth century, during the reign of the Tomar dynasty of Gwalior, were also surveyed and studied:

TEMPLE SURVEY, SOUTHERN REGION .—During the period under review, following Chola temples in Kamataka have been visited for preliminary documentation : Arkesvara temple, Doddabagilu; Gopalakrishna temple, Kaliyuri Rajarajavitankan temple, Madhavamantri Dam; Mahadeva temple, Nandigunda; Sankaresvara temple, Sindhuvalli; Somesvara temple, Echiganahalli; Isvara temple (ruined), Kampanapura; temple sites (ruined), Binnamangala; temple sites (ruined), Ennugumpa; Isvara temple (ruined), Chikkatti; Mudikondesvara temple, Mudikonda; Lakshminarayana temple, Mudikonda; Isvara temple, Kollegal; Lakshminarayana temple, Kollegal; Janardana temple, Tadimalingi; Mahalingesvara temple, Bannuru; Somesvara temple, Sulturu; Suryanarayanasvami temple, Sulturu; Arkesvara temple, Vijayapura, Talkad; Marlesvara temple, Talkad; Patalesvara temple, Talkad and Balamurri temple, Balamurri.

IX. PRESERVATION OF MONUMENTS

MONUMENTS OF NATIONAL IMPORTANCE

AGRA CIRCLE

Uttar Pradesh

1. AGRA FORT, AGRA, DISTRICT AGRA. — The obliterated and decayed geometrical and floral stucco on the walls of the central gallery of the Shish Mahal were restored with lime mortar. Missing and decayed convex glass mirrors were also replaced. The inner surface of the fortification wall was underpinned at several places and dislodged veneering dab and qued stones were reset. The decayed moulding of the *kanguras* was reproduced matching the original. The missing flagstones of the floor of side verandah of the main courtyard of the Machchi Bhavan were replaced with new ones. The loose and dislocated gilded copper sheets over the roofs of the Khas-Mahal, Samman Burj and those of Roshanara and Jahanara pavilions were reset with copper nails (pl. XLIII).

2. ITIMAD-UD-DAULA'S TOMB, AGRA, DISTRICT AGRA. — The worn-out brickwork of the compound wall of the tomb was underpinned in patches at several places.

3. KOS MINAR, AGRA-FATEHPUR SIKRI ROAD, DISTRICT AGRA.—The decayed plaster of the Kos Minars, situated on the Agra-Fatehpur Sikri Road was removed and replastered.

4. TAJ MAHAL, AGRA, DISTRICT AGRA. — The decayed and dead concrete roof terrace of the *dalan* of the eastern gate was removed and reconcreted. The walls were repaired and underpinned. Decayed and exfoliated ornamental stone panels in the north-western comer of the main gate were replaced with new stones as per original design (pl. XLJV). Missing inlay pieces in black and white marble at the main gate were also restored (pl. XLV). The decayed plaster on the walls of the first floor rooms of the main mausoleum was replaced with special lime mortar and the floor was concreted. The broken and missing red sandstone of the floor of the Chameli Mahal were restored, maintaining the original pattern. The open joints of northern, western and eastern arches of the outer facade were pointed with special mortar matching the original. Missing and broken spouts of marble terrace were restored. Worn-out and missing carved marble railing and *muttakas* and inlay bars and pieces of the southern railing were also replaced with new ones. Decayed and missing design on the stones of the pavement running with the eastern enclosure wall was reproduced at several places on original pattern and sunken stones were reset. Missing and dislodged stones of the western enclosure wall were restored and reset. Fallen *guldastas* of the gate were restored in original fashion.

5. FATEHPUR SIKRI GROUP OF MONUMENTS, FATEHPUR SIKRI, DISTRICT AGRA.—The work of filling up joints, replacing the missing and decayed red sandstone slabs, etc., of Madam's House, Diwan-i-Khas, school, Panch Mahal and Jodha Bai's palace was attended to. Missing *chhajjas* of the Ankh-Michauli and missing inlay pieces at the plinth of Salim Chisti's tomb were replaced.

Decayed and dead concrete roof of superstructure of Stone-Cutter's Masjid was replaced with fresh concrete and the damaged parapet wall reconstructed.

The vegetation growth was removed from the fortification wall and gate. The partly damaged bastion on eastern flank was reconstructed (pl. XLVI).

The excavated area was cleared of vegetation and the remains around the Badshahi-gate were consolidated by pointing and watertightening the walls.

6. DHAKRI-KA-MAHAL, GOPALPURA, DISTRICT AGRA.—The work of underpinning and pointing of the enclosure walls was carried out.

7. AKBAR'S TOMB, SIKANDRA, DISTRICT AGRA.— The cupolas of the first, second and third storeys of the mausoleum were repaired and missing red sandstone *jali* and *muttakas* of the first floor of the main mausoleum were also restored.

8. SURYA TEMPLE, KATARMAL, DISTRICT ALMORA.—The bulged out portion of the retaining wall was taken out and rebuilt. The dilapidated western compound wall was also restored.

9. DANDESVAR TEMPLE, KOTLI AND GANDHAK GUNTH, DISTRICT ALMORA.—The uneven western part of the area of the temple was levelled and the eastern part was paved with flagstones. Iron railing was fixed at the newly constructed retaining wall.

10. REMAINS OF SIXTEEN TEMPLES, ADBADRI, DISTRICT CHAMOLI.—An iron railing was provided on the front side of temple and a collapsible shutter was fixed with the main door of the *kirtan mandapa.* The open joints of the roof of *mandapa* and floor were pointed and watertightened.

11. MOSQUE AND SARAI, KUDAGANJ, DISTRICT FARRUKHABAD.—Bulged out portions of the wall were taken out and restored. The dead plaster on the kiosks of the mosque was removed and replastered with fresh lime mortar matching the original. Decayed moulded design in the spandrels was reproduced

12. MADANA MOHANA TEMPLE, BRINDABAN, DISTRICT MATHURA.—Dead and decayed plaster on the walls of the temple was removed and replastered. A retaining wall was constructed on the river side and its top was consolidated by concrete motrar.

13. BALESVAR TEMPLE, CHAMPAWAT, DISTRICT PITHORAGARH.—The fallen compound wall was suitably rebuilt and provided with barbed wire fencing alongwith iron posts. The iron gates with lock system were added to the compound wall for the security of loose sculptures.

BANGALORE CIRCLE

Karnataka

14. KALLESVARA TEMPLE, ANGOOR, DISTRICT BELLARY.—4n continuation of the last year's (1988-*89,* p. 135) work, the buttress provided to the facade and to the walls of southern shrine were removed. The out-of-plumb outer wall of all the three shrines was dismantled and reconstructed after strengthening the foundation (pl. XLVII). The ugly parapet in ashlar masonry was removed.

15. KALLESVARA TEMPLE, BAGALI, DISTRICT BELLARY.—The northern wall of the *mandapa* was provided with an ashlar masonry veneer. The out-of-plumb eastern end masonry parapet along the *hara* was removed and dismantled and reconstructed after consolidating the foundation with a layer of cement concrete (pl. XLVIII). Similar buttress provided to the eastern wall of the Narasimha shrine was removed and reconstructed.

16. EXCAVATED STRUCTURES TO THE EAST OF HAZARA RAMACHANDRA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.—The out of alignment basement of the east-south-east entrance of the *mandapas* was reconstructed by using the same materials. The pavement in-between the *mandapas* was re-paved. Dislodged brackets and beams of the *antarala* of the newly exposed Virabhadra temple, were restored to its original position. Reflooring was done in the *navaranga* and the *mukha-mandapa* using roughly dresssed slabs of stone . The *nandi-mandapa* was reconstructed. The original *nandi* image was set in its position. Similar conservation measures like dismantling and reconstruction was done to the corbelled-arched entrance and adjoining *mandapas.*

17. PATTABHIRAMA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.— Underpinning the masonry *gopura* was completed.

18. ROYAL ENCLOSURE, KAMALAPURAM, DISTRICT BELLARY.— The fallen and out-of-plumb portions of the inner and outer enclosure walls on the eastern side were reconstructed as per original after dismantling and strengthening the foundation. The rank vegetation and debris from the passage in-between the walls were removed and a water carrier reconditioned. The gap that was produced to lay an approach road to the enclosure long ago was closed by constructing a new connecting wall as per original.

19. KRISHNA TEMPLE, KRISHNAPURAM, DISTRICT BELLARY.—The out-of-plumb south-east comer portion of the outer *prakara* was dismantled and reconstructed after consolidating the foundation. The *mandapa* located in the north-west comer of the *prakara* was dismantled, and the reconstruction work is in progress. The broken lintel of the southern *mahadvara* was mended *in situ* using non-magnetic stainless steel clamps and epoxy resin.

20. NARASIMHA STATUE, KRISHNAPURAM, DISTRICT BELLARY.—The dislodged stone members of the enclosure wall and the door jambs were dismantled and reconstructed.

21. MALLIKARJUNA TEMPLE , KURUVATTI, DISTRICT BELLARY.— The *prakara* of the temple was re-paved with new stones wherever the old ones are missing.

22. ACHYUTARAYA TEMPLE, VENKATAPURAM, DISTRICT BELLARY.— The unaesthetic masonry supports provided to the broken beam and the lintel of the outer *mahadvara* was dismantled. The lintel was mended using non-magnetic stainless steel pins and the beam was replaced. The broken and missing slabs of the inner bay of the *mahadvara* was replaced and rendered watertight. Similar repairs in the inner *mahadvara* is in progress. The dislodged members of the *mandapa,* located in the north-east comer was also dismantled for reconstruction alongwith the buttress and the out-of-plumb north-eastern comer of inner *prakara.*

23. VITHALA TEMPLE, VENKATAPURAM, DISTRICT BELLARY.— The dislodged and out-of-plumb members of the eastern portion of the northern cloister *mandapa* alongwith a portion of the *prakara* wall was dismantled for reconstruction and the work is in progress. In the *kalyana mandapa,* the unevenly sunken flooring was relaid. The broken beam of the same was mended with non-magnetic stainless steel pins after dismantling and reconstructing the brick-masonry parapet. The accretionary stone-masonry flight of steps was removed. The broken roof-slabs of the bay of the northern *mahadvara* was strengthened by inserting I-section girders. The overhanging brick masonry *gopura* was strengthened by providing girders within the *gopura.*

24. TFMPLE OF LADKHAN, AIHOLE, DISTRICT BUAPUR.— The archaeological area in front of Ladkhan temple was levelled and a retaining wall was provided.

25. KOSHTARAYA CAVE, BADAMI, DISTRICT BUAPUR .— The fallen southern wall was reconstructed with a finish matching with the surrounding sandstone environs. The rain-water which was draining through the sides was diverted by a dwarf wall.

26. ASAR MAHAL, BUAPUR, DISTRICT BUAPUR.—The weathered edge-stones on the southern side and the flight of steps on south-east and south-west of the tank, located in front of Asar Mahal, were replaced with new ones matching in colour, texture and chiselling with the original. The missing top courses of the northern gateway were reconstructed in matching masonry to avoid seepage of water through the core of the wall. The decayed wooden doors of the gateway were replaced by using the salvaged wood. The cracks found on the door frame were filled with wood-fillets and adhesive. Wood preservative was applied to the wooden members. The roof of the gateway was missing. It was relaid after providing new rafters and strengthening the weak ones. The platforms flanking the gateway was resurfaced with cement concrete.

27. GOL-GUMBAZ, BUAPUR, DISTRICT BUAPUR.—The open arches of the *dalans* were closed with weld-mesh frames with glass-panes. The decayed pointing of *Naqqar-Khana,* housing the Museum, was raked out and freshly pointed with combination mortar, suitably coloured with oxides.

28. VISHVESVARA TEMPLE , HALLUR, DISTRICT BUAPUR.—The leaky joints of the *sikhara* were pointed with epoxy resin. The roof of the *mandapa* was provided with a waterproof course.

29. WATER-PAVILION, KUMATGI, DISTRICT BBAPUR.— The area surrounding the pavilion was covered with jungle which was cleared and the ground levelled.

30. SANGEET MAHAL, TORVI, DISTRICT BUAPUR.—Jungle clearance around the Nan Mahal is in progress. During the course of the debris clearance many structural remains were encountered.

31. AMRITESVARA TEMPLE, AMRITAPURA, DISTRICT CHIKMAGALUR.—A revetment wall was constructed to the north of the archaeological area. Fencing of the same is in progress.

32. FORTRESS AND TEMPLES, CHITRADURGA, DISTRICT CHITRADURGA.—The decayed concrete roof of Kasi Visvesvanatha temple and the Anjaneya temple was removed and a new course was applied. Within the former, the cracked beam in the *mukha- mandapa* was mended *in situ* using non-magnetic stainless steel clamps. The fallen retaining wall of the Maddu Bisuvakallu was reconstructed (pl. XLIX). The archaeological land was fenced.

33. BHILLESVARA TEMPLE, FORT, HANGAL , DISTRICT DHARWAD.—The out-of-plumb veneer of the shrine was dismantled for reconstruction after suitably strengthening the foundation. The accretion-ary rubble masonry was dismantled for reconstruction. The work is in progress.

34. SHIDDESVARA TEMPLE, HA VERI DISTRICT DHARWAD.—The buried *adhisthana* of the Narasimha shrine was exposed and reconstructed by providing new stone members wherever old ones were missing. The accretionary and unaesthetic rubble wall was dismantled and construction of a new wall in dressed schist stone was taken up.

35. JAINA BASTI, LAKKUNDI, DISTRICT DHARWAD.—Modem accretionay wall along the *hara* portion and on the northern side of the shrine was dismantled and fresh wall was constructed in matching masonry. Pointing was done wherever necessary.

36. KESAVA TEMPLE, BELUR, DISTRICT HASSAN.— The work of remodelling the decayed stucco figures as per the orignal on the *gopura* of the eastern *mahadvara* was taken up (pl. L).

37. HOYSALESVARA TEMPLE, HALEBID, DISTRICT HASSAN.—The decayed concrete roof was raked out. The joints of the roof-slabs were pointed before laying a fresh course of lime concrete.

38. SADASIVA TEMPLE, NUGGEHALLI, DISTRICT HASSAN.— The out-of-plumb southern wall was dismantled and reset as per original.

39. FORT AND LARGE MASONRY ELEPHANTS. MADIKERI, DISTRICT KODAGU.—The decayed plaster of the parapet was removed and freshly plastered. The joints of the fortification was pointed in combination mortar with matching colour.

40. JAINA TEMPLE, MULLUR, DISTRICT KODAGU.— The decayed concrete over the roof of the temple was removed and a fresh course was applied after pointing the joints of the slabs. Replastering was done to the *sikhara.* The area around the temple was cleared and a retaining wall was constructed at northern side.

41. RAMALINGESVARA TEMPLE, AVANI, DISTRICT KOLAR.—The out-of-plumb southern entrance, on the inner side, was dismantled and reconstructed as per original The dead concrete over the Kamakshi shrine was removed and a fresh course applied. Replastering of Bharatesvara, Anjaneya and Sugriva shrines were done in combination morter after removing the dead plaster.

42. SIDLU MALUKARJUNA TEMPLE, BETTADAPURA, DISTRICT MYSORE.—The Amman shrine and *the pakasala* were refloored and replastered. The *nandi-pitha* was reset. The area around the temple was levelled.

43. FORTRESS AND RENUKA TEMPLE, CHANDRAGurri, DISTRICT SHIMOGA.—The out-of plumb north eastern comer of Renuka temple was dismantled and reconstructed as per original.

44. BASTIS, HUMCHA, DISTRICT SHIMOGA.— The Parsvanatha and Chandranatha *bastis* were refloored by resetting the sunken flooring. Accretionary structures were removed to expose the *adhisthana. A* broken beam was replaced with new one matching with the original. The accretionary Mangalore tiled roof provided to the *sikhara* of Parsvanatha *basti* to ward off rain water was removed (pl. LI).

45. RAMESVARA TEMPLE, KELADI, DISTRICT SHIMOGA.— The flight of steps to the southern and western entrance were repaired. The courtyard was re-paved. Fencing was done.

46. RAMESVARA TEMPLE, KUBATTUR, DISTRICT SHIMOGA.—The stone pavement around the temple was relaid.

47. JAINA BASTI, MELAGI, DISTRICT SHIMOGA.— An approach road was laid to the monument. The open area around the *basti* was re-paved.

48. SIVAPPA NAIK'S FORT, NAGAR, DISTRICT SHIMOGA.—The ramp leading to the gate was relaid and paved with slabs. The dislodged parapet of the same was reconstructed. The rank vegetation covering the curtain walls were removed.

49. CHANNIGARAYA TEMPLE, ARALAGUPPE, DISTRICT TUMKUR,— The out-of-plumb eastern and southern portion of the *bhitti* was removed and reconstructed after strengthening the foundation. Pointing and watertightening the wall-joints and the roof were done.

BHOPAL CIRCLE

Madhya Pradesh

50. OLD FORT, LANJI, DISTRICT BALAGHAT.— In continuation of last year's work *(1988-* S9,p. 140), the restoration of collapsed portion of stone brick masonry fort wall was completed.

51. CHOPRA TANK, KHAJURAHO, DISTRICT CHHATTARPUR.— In continuation of last year's work (*1988-89,* p. 140), the replacement of the old low level barbed wire fencing on stone posts around Chopra tank with high level barbed wire fencing on angle iron posts and restoration of parapet wall of the tank was completed.

52. GHANTAI TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR.—In continuation of last year' s work *(1988-89,* p. 140),the replacement of the old, damaged low level barbed wire fencing on stone posts with high level G.I. barbed wire fencing on angle iron posts, and lime concreting of the approach path and providing apron to check the cutting of path and ingress of rain water was completed.

53. KAKRA MARH, KHAJURAHO, DISTRICT CHHATTARPUR.— In continuation of last year's work *(1988-89,* p. 140), the restoration of old damaged retaining wall and enclosing the area with

G.L barbed wire fencing on angle iron posts was completed.

54. LALGUAN MAHADEVA TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR.— In continuation of last year's work(1988-89,p.l40),the damaged and missing courses of facade and flooring of the platform were replaced. The area around was enclosed with G.I. barbed wire fencing.

55. SIVA TEMPLE, KANAKA BARI, DISTRICT DAMOH.— In continuation of last year's work *(1988-#9,p.l41)*, the R.R. masonry compound wall on old traces was restored.

56. FLAT-ROOFED TEMPLE , KUNDALPUR, DISTRICT DAMOH.—The stone slab roof was replaced with fresh dressed single stone slab matching to the original. Restoration of platform is in progress.

57. TEMPLE, NOHTA, DISTRICT DAMOH.— Raising of low level compound wall in R.R. stone masonry to check the trespassing is in progress.

58. BIR SINGH PALACE, DATIA, DISTRICT DATIA.— In continuation of last year's work (*1988-89*,p.l41),the replacement of the old, damaged and decayed concrete of roof terrace with fresh lime concrete was made watertight.

59. ROCK INSCRIPTION OF ASOKA, GUJJARRA, DISTRICT DATIA.— Enclosing of rock edict with dwarf wall surmounted with M.S. grill railing to protect it from vandalism remained in progress.

60. BUDDHIST CAVES, BAGH, DISTRICT DHAR.—In continuation of last year's work *(1988-89,* p. 141), the construction of two R.C.C. pillars with beams and slab in place of old, damaged and missing rock-cut pillars, beams and slab in Cave 4 in addition to sixteen R.C.C pillars already constructed was carried out with rock-toning in lime *surkhi* plaster matching to the original. The air gap between R.C.C slab and concaved ceiling was filled with empty inverted earthen pitchers as done earlier to avoid impact of falling chunks. Lime concrete was laid over the layer of cement concrete on the roof of Cave 4,5 and 6 to check the ingress of rain water and made the roof terrace wate rtight. Construction of four R.C.C pillars in place of missing rock-cut pillars in Cave 6 remained in progress.

61. BHOJASALA, DHAR, DISTRICT DHAR.— In continuation of last year's work, the replacement of old decayed and damaged stone flooring of prayer hall with fine chiselled lime stone flooring on lime concrete base remained in progress.

62. LAT KI MASJID, DHAR, DISTRICT DHAR.— Restoration of decayed and bulged stone wall with fine dressed ashlar stone masonry remained in progress. The old, decayed and damaged roof concrete was replaced with fresh lime concrete and roof terrace made watertight.

63. GADASHAH'S PALACE , MANDU, DISTRICT DHAR.— In continuation of last year's work (*1988-89,* p. 141), the cells were cleared off by removing the debris of fallen portions. The old pipe-line of fountains was restored. Old, decayed, damaged and missing floor concrete of cells and platforms were replaced with fresh lime concrete. Damaged and missing decorative door-sill, lintel and *jalis* were also repaired with fresh fine chisel dressed lime stone with similar decorative designs.

64. JAHAZMAHAL, MANDU, DISTRICT DHAR.—In continuation of earlier work *(1987-88,*p.180), restoration of steps of upper and lower tank with fine chisel dressed limestone steps was completed.

65. JAMA MASJID, MANDU, DISTRICT DHAR.— The arch openings of ladies balcony on first floor were provided with wire mesh on angle iron frame and M.S. flats to check the entry of bats. Restoration of damaged and missing *chhajjqs* with fine chisel dressed limestone remained in progress.

66. KAPOOR TALAV, MANDU, DISTRICT DHAR.—In continuation of last year's work *(1988-89,* p. 141), the restoration of enclosure wall in R.R. masonry and pointing with lime mortar to check the ingress of water was completed.

67. NEELKANTH, MANDU, DISTRICT DHAR.—In continuation of last year's work (*1988-89,p.* 141), the damaged approach steps leading to temple were replaced with fresh fine chisel dressed stones and provided with G.I. pipe railing to facilitate the visitors.

68. TAVEU MAHAL, MANDU, DISTRICT DHAR.— In continuation of last year's work (2955-59,p. 141), the decayed and damaged floor concrete of underground cells was replaced with fresh lime concrete. The arch openings were provided with door shutters.

69. BATTISI BAOLI, CHANDERI, DISTRICT GUNA.—Restoration of damaged wall with stone masonry remained in progress.

70. KOSHAK MAHAL, CHANDERI, DISTRICT GUNA.— In continuation of last year's work (7955-59, p. 142), the missing veneering stones of outer facade of western wall and central arches were restored with fine chisel-dressed ashlar veneering stones.

71. SINGHPUR PALACE, CHANDERI, GUNA.— In continuation of last year's work *(1988-89,p.* 142), the damaged compound wall was restored in R.R. stone masonry. Construction of R.C.C. overhead water tank and laying of pipe-line through P.H.E.D., Guna, remained in progress.

72. FORT, GWALIOR, DISTRICT GWALIOR.—In continuation of last year's work (J9SS-S9,pp. 142-143), the approach steps of the rock-cut Jaina colossi were widened and relaid on cement concrete base. G.I. pipe railing was also provided on the right side of the flight of steps. Door openings of Cave 3-4,7,14,15,22-24 and 26 were provided with M.S. door shutters with welded wire mesh to avoid vandalism and check the entry of bats. The forecourt of the caves was pitched with stones on cement concrete base to bear the thrust of rain water coming from the fort wall. The work is in progress.

The construction of reinforced coursed rubble stone masonry retaining wall to provide support to the foundation of Bastion 3 of the Man Singh's Palace remained in progress.

73. TOMBS OF MOHAMMAD GHAUS AND TANSEN, GWALIOR, DISTRICT GWALIOR.— In continuation of last year's work (2955-S9,p.l43), the fissures of Tansen tomb were sealed with araldite and finished with sandstone dust and damaged stone *jalis* repaired. The platform of the grave was repaired and the laying of Mughal pattern garden is in progress. Stone tablets were removed from the walls of the Mohammad Ghaus and Tansen tombs and fixed on separate pedestals. The work is in progress.

74. DURGA DEVI TEMPLE, TIGWAN, DISTRICT JABALPUR.— In continuation of last year's work *(1988-89,* p. 143), the cracked arch and wall was restored with chisel dressed ashlar stone masonry. R.R stone masonry supports were dismantled and the area levelled.

75. FORT, ASIRGARH, DISTRICT KHANDWA.— In continuation of last year's work (*1988-89,* p. 143), debris of fallen portions of temple inside the fort was removed and restored.

76. BIBI SAHIB'S MASJID, BURHANPUR, DISTRICT KHANDWA.—In continuation of last year's work (*1988-89,* p. 143), decayed and damaged stones were replaced with fine chisel-dressed stones. Damaged and decayed flooring was also replaced with fresh lime concrete flooring.

77. RUINED PALACE INSIDE FORT, BURHANPUR, DISTRICT KHANDWA.— In continuation of last year's *work (1988-89,* p. 143), the steps and its covering leading to the river were restored. The damaged and decayed concrete roof terrace was replaced with fresh lime concrete. The work is in progress.

78. CHAUBARA DERA, UN, DISTRICT KHARGONE.— In continuation of last year's work (*1988-89,* p. 143), stone pitching of the Chaubara Dera No. 1 was replaced with flagstone flooring. Compound wall was constructed in G.R. stone masonry in place of barbed wire fencing."

79. BEGAM MAHAL, RAMNAGAR, DISTRICT MANDLA.—In continuation of last year's work *(1988-89,* p. 143), silt deposited in cells was removed and cavities underpinned wherever necessary. Damaged and decayed flooring was replaced with fresh lime concrete.

80. EKOTTARSO MAHADEVA TEMPLE, MITAOLI, DISTRICT MORENA.—The debris of fallen portion of circular corridor was removed and serviceable stones sorted out and stacked properly for reuse in restoration work. The work is in progress.

81. KAKANMADH TEMPLE, SUHANIA, DISTRICT MORENA.— One set of tubular scaffolding was procured and sand-fill bags support provided. The work is in progress.

82. FORT, AJAIGARH, DISTRICT PANNA.—In continuation of last year's work *(1988-89,* p. 143), M. S. grill was provided in the frontage of cell for security of sculptures and passing of light to avoid darkness in the cell. Platform was also restored.

83. ROCK-SHELTERS, BHIMBETKA, DISTRICT RAISER—In continuation of last year's work *(1988-89,* p. 144) an approach path leading to Zoo-rock and further rock-shelter downward was provided with stone edging and paved with lime concrete with flat stone boulders.

84. BUDDHIST MONUMENTS, SANCHI, DISTRICT RAISEN.—In continuation of last year's work *(1988-89,* p. 144), Stupa 4 was restored and the periphery of Stupa 3 and 4 was paved with stone flooring. Construction of road barrier and restoration of walls of the cells of Monastery 46 remained in progress.

85. FORT, DHAMONI, DISTRICT SAGAR.— In continuation of last year's work *(1988-89,* p. 144), vegetational growth from the fort-wall and adjoining area was removed and damaged portions of the wall were restored in R.R. stone masonry.

86. TEMPLE AND MONASTERY, CHANDREH, DISTRICT SIDHI.—Restoration of cells, replacement of old, decayed and damaged concrete roof terrace with fresh lime concrete and enclosing the area with G.I. barbed wire fencing on angle iron posts remained in progress.

87. MONASTERY, RANOD, DISTRICT SHIVPURI.— In continuation of last year's work *(1988-89,* p. 144), damaged wall and arches were restored in fine chisel dressed ashlar stone masonry.

88. CAVES, UDAYGIRI, DISTRICT VIDISHA.—Openings of the Cave 13 and 20 were closed with M.S. grill and masonry. Joints of rock were sealed to check the ingress of rain water in caves and pitching of the approach path leading to Cave 13,19 and 20 remained in progress.

BHUBANESWAR CIRCLE

Madhya Pradesh

89. ANCIENT SCULPTURES, BARSUR, DISTRICT BASTAR.—The work of construction of sculpture shed was completed.

90. CHANDRADITYA TEMPLE, BARSUR, DISTRICT BASTAR.—Boundary pillars were provided all around the Chandraditya Temple.

91. MAHADEVA TEMPLE, BASTAR, DISTRICT BASTAR.— Water-tightening of the *sikhara* was attended to.

92. DANTESVARI TEMPLE, DANTEWADA, DISTRICT BASTAR.—The area around the *Bhmmva.-mandapa* was provided with grill gates. The dilapidated kitchen was restored and a drain was provided on the western and southern sides for easy drainage of rainwater.

93. KAMMA MEMORIAL, DILMIL, DISTRICT BASTAR.—The damaged wooden pillar known as Kamma Memorial at Dilmil is being consolidated with stuffing.

94. MEGA Lrraic SITE, GAMMEWADA, DISTRICT BASTAR.— The surroundings of the site were improved by providing gates, etc.

95. KARLI MAHADEO TEMPLE, SAMPUR, DISTRICT BASTAR.—The work of fencing around the newly acquired land was completed.

96. ARBHAR TEMPLE, ARBHAR, DISTRICT BILASPUR.—The construction of compound wall around the Arbhar temple was completed.

97. BRICK TEMPLE OF SAVARI, KHAROD, DISTRICT BILASPUR.— Construction of compound wall around Savari temple is in progress.

98. BHIMA-KICHAKA TEMPLE, MAIHAR, DISTRICT BILASPUR.—A temporary sculpture shed was constructed to house the valuable loose sculptures lying in the open and getting eroded due to weathering.

99. SIVA TEMPLE, DEOBALODA, DISTRICT DURG.—A pillared *mandapa* for the bull in front of Siva temple was constructed.

100. BHAND DEWAL, ARANG, DISTRICT RAIPUR.—Fencing above the existing compound wall :vas completed to check misuse and trespassing by local residents.

101. MAHADEVA TEMPLE, NARAINPUR, DISTRICT RAIPUR.— The restoration of pavement by flagstone slabs around the temple and on the platform of front part was completed.

102. ANCENTSITE, SKPUR, DISTRICT RAIPUR.—Colouring work of both inner and outer wall of the existing sculpture shed at Sirpur was completed.

Orissa

103. RUINS OF BUDDHIST TEMPLES, BANDARESWAR, DISTRICT CUTTACK.—The front side of the ancient site was fenced.

104. BARABATI FORT, CUTTACK, DISTRICT CUTTACK.—Improvement of Barabati Fort gate was attended to by providing fencing to avoid misuse of the area. Structural repairs and chemical cleaning were also attended to. Floodlights were provided.

105. PANCHA PANDAVA TEMPLE, GANESWARPUR, DISTRICT CUTTACK.— Fencing around the protected monument was completed.

106. RUINS OF BUDDHIST TEMPLES AND IMAGES, LALTTAGIRI, DISTRICT CUTTACK.— The newly exposed apsidal *chaitya-griha* (pl. LII) and its pathways were reconditioned and restored (pl. LIII). Brick wall was provided upto a limited height following robber's trench to bring back the apsidal plan. The loose votive stupas around the apsidal *chaitya-griha* on the periphery *of the pradakshina-patha* is permanently displayed by providing stone masonry platform as per original alignment.

Extension of the sculpture shed was taken up and completed.

107. BUDDHIST MONASTIC COMPLEX, RATNAGIRI, DISTRICT CUTTACK.—Fencing on the western and northern sides of the protected monastic complex was completed.

108. MONASTIC CCOMPLEX, UDAYAGIRI, DISTRICT CUTTACK.—The missing wall of the Stupa was restored (pl. LIV). The courtyard of this monastic complex (pl. LV) was brought to uniform level by re-setting the missing stone blocks.

109. PANCHAMUKHI-LINGA, SITABHANJI, DISTRICT KEONJHAR.—Fencing around Panehamukhi-*linga* and Brahmi inscriptions on rock boulder was completed including clearance of the site and monument.

110. TEMPLES OF NDLAMADHAVA AND SIDDHBSVARA, GANDHARADHI, DISTRICT PHULBANI.—The dilapidated thatched- kitchen of Nilamadhava and Siddhesvara temples was replaced by newly constructed kitchen block. Lighting arrangements, grill-gates were provided on both the temples. Front opening with *nagara-sikhara* temple design grill was provided.

111. BAKESVARA TEMPLE, BHUBANBSWAR, DISTRICT PURL—Worn-out architectural members of the western side of *jagamohana* of Bakesvara temple were dismantled and replaced with carved sandstones as per original.

112. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT PURI.— Worn-out and damaged courtyard (pl. LVI) and sub-shrines in Lingaraja Temple complex on north and west sides were restored.

113. PAPANASINI TANK, BHUBANESWAR, DISTRICT PURL— Fallen southern wall of the tank was repaired and the fencing work completed.

114. RAJA RANI TEMPLE, BHUBANESWAR, DISTRICT PURI.— Construction of dwarf laterite masonry wall on the west and south sides of Raja Rani temple and providing barbed wire fencing above the wall was completed to protect the temple from misuse by villagers and cattle.

115. VARAHU TEMPLE, CHAURASI, DISTRICT PURI.—The work of fencing the protected area was completed and turnstile and main gates provided.

116. ASOKAN ROCK EDICTS, DHAULI, DISTRICT PURL— The area around the Asokan rock-edict at Dhauli was fenced, and the main gate, turnstile gate etc., were fixed.

117. SUN TEMPLE, KONARAK, DISTRICT PURI.—The restoration of the dilapidated *adhiskthana* was taken up and the north and south sides completed. The work is in progress.

118. JAGANNATHA TEMPLE COMPLEX, PURI, DISTRICT PURI.— The old plaster from *beki* and *amalaka* of Ganesa temple was removed and damaged portions were dismantled and refixed (pl. LVII). Grouting, pointing and underpinning work is in progress.

The underpinning of the decomposed and mutilated architectural members of Jagannatha temple is in progress.

The deplastering of Vimala temple was completed upto *beki* level (pl. LVIII). Grouting and underpinning, refixing of the dislodged and broken architectural members was also taken up simultaneously.

The construction of the drains on the northern side underneath the stone platform of courtyard is in progress.

CALCUTTA CIRCLE

Sikkim

119. CORONATION THRONE OF NORBUGANG, DISTRICT WEST SIKKIM.— The protected area was cleaned by removing huge vegetation growth. Lime-cement concrete bed was provided around the structure. The missing portion of the stone masonry wall was restored with lime cement mortar as per original and pointing the open joints of stone masonry wall was also attended to.

120. RABDENTSE SITE OF ANCIENT CAPITAL OF SIKKIM, WEST SIKKIM.—The approach road to the site was cleared off the growth of vegetation and jungle and repairs wherein necessary, was attended to including restoration and pointing of the walls.

WestBengal

121. MADANA MOHANA TEMPLE, B ISHNUPUR, DISTRICT BANKURA.—The foundation was strength ened by providing cement concrete. The terraced floor and the roof were also provided with lime concrete as per original in colour and texture.

122. MURAU-MOHANA TEMPLE, BISHNUPUR, DISTRICT BANKURA.—Bulged and hanging part of the laterite stone structure and foundation pillar of the western porch of the temple were dismantled and repaired as per original. R.C.C. foundation was provided to the columns of the north-western comer and for the basement of other pillars and plinth. Laterite stone masonry of pillars, basements and walls were also restored. Damaged and defaced portions in the walls, arches, vaults, etc., were repaired and brought to their original shape including the ornamental work. Hidden, old and rusted M.S. beam was replaced by new ones.

123. GROUP OF TEMPLES, BEGUNIA (BARAKAR), DISTRICT BURDWAN.—The damaged portion of the compound wall was repaired by brickwork. The accumulated rainwater from the compound was drained out. The bottom of the drain was provided with lime terracing including the plastering of inside wall and the top of the drain was covered with R.C.C. slab. Wooden doors and windows of the temple were renewed and painted. Uprooting of deeply rooted trees was also done.

Lime sand plaster as per original on the north and west wall in patches was done. Pointing the open joints of the temple; inside the compound as well as on the outer wall was done with requisite mortar as per original.

124. JAINA BRICK TEMPLE, DEULIA, DISTRICT BURDWAN.—Ornamental brickwork was renewed in the cornice and southern wall with requisite mortar and the open joints of the outer surface of the wall were filled up. Deep rooted trees from the temple were removed followed by proper mending.

125. PALACE, COOCH BEHAR, DISTRICT COOCH BEHAR.—Cement concrete pathway to the main entrance on the eastern side of the palace was provided with brick edging. The top surface of the pathway was plastered.

126. BRINDABAN CHANDRA'S MATH, GUPTIPARA, DISTRICT HOOGHLY.— After removing care fully the salt-impregnated portion of the masonry wall, repairing and refacing were done. The damaged and missing ornamental brickwork in the pillar was restored as per original. Lime terracing was done on the damaged portion of the floor of the temples and on top of the compound wall accordingly. 19 mm thick plastering was done on the damaged portion of the wall. Basement wall of the temple was pointed and wooden doors and windows were repaired and painted.

127. ADINA MOSQUE, PANDUA, DISTRICT MALDA.—Damaged and defaced heavy stone blocks of the wall were removed and replaced by filling up the voids with available stone blocks *in situ.* The decayed bricks were also removed and restored matching with the original. The roof concrete wherever decayed and pulverized was removed and reconcreted. Barbed wire fencing was repaired and renewed wherever necessary alongwith the fixing of missing L-iron posts. Painting of the L-iron posts was also attended to.

128. HAZARDUARI PALACE AND IMAMBARA, MURSHIDABAD, DISTRICT MURSHIDABAD.— The old decayed concrete from the roof was removed and reconcreted. Damaged and worn-out wooden beams and *bargahs* were replaced by new ones as per existing ones. The patches in the exterior walls were painted with waterproof cement in two coats. Wooden mesh was provided with the existing iron railings. Doors and windows, wherever necessary, were repaired and the exterior walls replastered.

Roof of the Durbar Hall was strengthened. The decayed wooden planks encasing the beams over main pillar of the entrance were replaced by new *Sal* wood planks.

The damaged and decayed wooden *bargahs* of the roof of the Imambara were replaced with new ones. Inclined *Chhajja* of the eastern courtyard was restored by changing decayed wooden members, relaying double layer of tiles with mortar and providing *lime-surkhi* plaster mixed with cement over tiles. 25 mm thick *lime-surkhi* plastering was done on the top wall over roof and also on the eastern and western wall of the *hauz* after removing the pulverised old plaster (pl. LIX).

129. EXCAVATED SITE OF BALLALDHIPI, BAMANPUKUR, DISTRICT NADIA.—Decayed and damaged portion of the brick wall, exposed during excavation was repaired and restored by using special sized bricks in composite mortar of *surkhi,* sand, lime-cement matching with the original in texture, size and shape. For draining out the accumulated rain water from the excavated trenches at the north eastern comer of the mound arrangement was also made by laying C.P. underground soil pipe.

130. TEMPLE AT BANDA, DISTRICT PURULIA.—Repair to the *sikhara* and on the main body of the temple was attended. The floor was repaired by lime concrete and unwanted vegetation was cleared and watertightening was done (pl. LX).

CHANDIGARH CIRCLE

Haryana

131. KOS MINARS, PALWAL, DISTRICT FARIDABAD.— Three Kos Minars were properly fenced with M.S. grill.

132. ANCIENT STUPA AT AGROHA, DISTRICT HISSAR.—Restoration and reproduction of damaged and disturbed brick masonry of the stupa with old Kushana bricks was taken up.

133. LAT OF FIRUZ SHAH, FATEHABAD, DISTRICT HISSAR.—*Lakhauri* brick masonry work on the boundary wall was taken up and completed.

134. GUJARI MAHAL, HISSAR, DISTRICT HISSAR.— Restoration of patches of random rubble stone masonry work on the east side of the monument was taken up and completed besides pointing the joints.

135. CANTONMENT NORTH CEMETERY, KARNAL, DISTRICT KARNAL.— Providing concrete floor ing and underpinning the north, western and eastern walls and pillars of the entrance was taken up.

136. CANTONMENT CHURCH TOWER, KARNAL, DISTRICT KARNAL.— The pulverized plaster was removed and replastered. The brick tile work over concreted base around the church was provided and the wide cracks on the east and north side walls were stitched besides the underpinning of roof top of the Church. Work of providing pathway inside the monument was taken up.

137. SHAIKH CHILLI'S TOMB, THANESAR, DISTRICT KURUKSHETRA— The work of providing marble flooring (pl. LXI) around the octagonal platform over concrete base and concreting of the terrace of the tomb was completed. The *lakhauri* brick masonry work around the parapet wall was taken up and completed. Underpinning the disturbed and decayed patches with *lakhauri* brick

masonry on the entrance gate of the tomb was also taken up and completed. Deplastering the decayed and pulverized modem plaster from the arches and cells on the entrance gate side was taken up and the loose and dislodged portions were exposed. Old decayed wooden beams from the open cells' of entrance gate were replaced.

138. MUGHAL SARAI, GHARAUNDA, DISTRICT PANIPAT.— The work of providing and laying concrete apron around and between the gates was taken up.

139. KABULI BAGH MOSQUE, PANIPAT, DISTRICT PANIPAT.— In order to stop encroachment, the protected area was fenced with barbed wire fixed in M.S. angle.

Punjab

140. RAM BAGH GATE, AMRITSAR, DISTRICT AMRITSAR.—The work of dismantling and removal of decayed and damaged red sandstones of the *deori* and reconstruction of foundation and pillar with brick tiles was taken up.

141. KOS MINAR, LUDHIANA, SAMRALA CHOWK, DISTRICT LUDHIANA.— The decayed and pulverized brick masonry of the Minar was removed and repaired. The area around was fenced (pl. LXII).

142. ANCIENT SITE, SANGHOL, DISTRICT LUDHIANA.—The area around the stupa was fenced with barbed wire. The consolidation and restoration of exposed structure of the monastery complex and reproduction of dismantled *matha* as per original pattern was taken up.

143. TOMBS OF MOHAMMAD MOMIN AND HAJI JAMAL, NAKODAR, DISTRICT JALANDHAR— The decayed and pulverized plaster of the cells was removed and raked out and replastered with lime, cement and *surkhi* (pl. LXIII). The work of removal of pulverized plaster and replastering the same on the north-east side of Haji Jamal tomb was also taken up.

144. SARAI INCLUDING GATEWAY, NURMAHAL, DISTRICT JALANDHAR.—The concreting work of roof of the cells (pl. LXIV) near main gate was taken up.

DELHI CIRCLE

Delhi

145. GTY WALL, KASHMIRI GATE, DELHI.—The fortification wall between Kashmiri gate and Mori gate was stabilized after carrying out underpinning and pointing work (pl. LXV).

146. DELHI FORT OR LAL QILA, DELHI.— Damaged and worn-out red sandstone flooring of Sawan pavilion was dismantled and new red sandstone flooring laid after providing a bed of cement concrete.

147. BAGH-I-ALAM-KA-GUMBAD, NEW DELHI.— Structural repairs which consist of random rubble masonry, pointing and laying lime-cement concrete flooring were carried out.

148. GHIYATHUD-DIN BALBAN'S TOMB, NEW DELHI.— Damaged and overhanging stone masonry wall was removed carefully and conserved following the original pattern by way of underpinning, grouting, pointing and watertightening (pl. LXVI).

149. KOTLA FIRUZ SHAH, NEW DELHI.—Damaged and bulged-out stone masonry of the bastion was restored in consonance with the original pattern followed by watertightening and pointing (pl. LXVH).

150. LOHA-WALA-GUMBAD, HAUZ KHAS, NEW DELHI.— Lime cement concrete flooring and plastering with combination mortar was carried out in accordance with the original pattern.

151. SKI FORT, NEW DELHI.— Underpinning of rubble stone masonry and pointing with combination mortar was executed matching the original pattern.

152. SHISH MAHAL, NEW DELHI.—Extensive structural repairs which involve underpinning of *lakhauri* brick masonry, plastering, providing and fixing red sandstone brackets were carried out in consonance with the original pattern.

153.. TOMB OF SAPDARJANG, NEW DELHI.—Structural repairs have been carried out by way of underpinning of *lakhauri* brick masonry and pointing to preserve the monument in accordance with the original pattern.

154. TUGHLAQABAD FORT, TUGHLAQABAD, NEW DELHI.— Bulged-out and damaged stone masonry bastion abutting southern side fortification wall was consenred conformity with the original followed by watertightening and pointing.

GUWAHATI CIRCLE

Arunachal Pradesh

155. TAWANG MONASTERY, DISTRICT TAWANG.— Repairs to kitchen, library and store of the monastery were attended to by way of white washing and plastering and patch works in stone masonry and flooring.

Assam

156. CACHARI RUINS, KHASPUR, DISTRICT CACHAR.— Retaining wall was provided to the Snan Mandir. The work of resetting ancient compound wall was also done.

157. AHOM PALACE, GARHGAON, DISTRICT SIBSAGAR.— Fortress wall in the north side was restored. Cracks were filled and ornamental protection was done by laying bricks on edge.

158. DEVIDOL, GAURISAGAR, DISTRICT SIBSAGAR.—Re-plastering of the remaining work of the temple with *lime-surkhi* mortar was completed. The stone flooring of the main shrine was reset.

159. SIBDOL, GAURISAGAR, DISTRICT SIBSAGAR.—The decayed plaster from outer surface of the temple was raked out and replastered as per original with *lime- surkhi* mortar. The work is in progress.

160. DEVIDOL, JOYSAGAR, DISTRICT SIBSAGAR.— The brick work was done with special size bricks set in *lime-surkhi* mortar at missing portions and plinth protection was done by laying brick-on-edge.

161. GHANASYAM'S HOUSE, JOYSAGAR, DISTRICT SIBSAGAR.— Lime concrete was relaid on the roof of the gateway. Brickwork in the missing portions was done. Ornamental plaster was also attended to.

162. KHARENGGHAR, JOYSAGAR, DISTRICT SIBSAGAR.—The open floor was concreted and area fenced with barbed wire. Brick work with special size bricks was done at missing portions of the parapet wall and the open floor.

163. RANGHAR RUINS, JOYSAGAR, DISTRICT SIBSAGAR.—The decayed concrete was removed and reconcreted and damaged plaster was raked out and replastered.

164. SIBDOL, JOYSAGAR, DISTRICT SIBSAGAR.— Catch water drain was provided for checking the seepage of water inside the temple by providing perforated R.C.C. pipe below by ground level overlaid by coarse stone aggregate, fine stone aggregate, sand and top finished as natural ground. Inspection chamber was also provided on the catch drain line.

165. DEVIDOL, SIBSAGAR, DISTRICT SIBSAGAR.— The plastering of the remaining part of the outer surface of the temple was completed with *lime-surkhi* mortar.

166. SIBDOL, SIBSAGAR, DISTRICT SIBSAGAR.—The decayed plaster of the spire of the temple was raked out and replastered. Cracks were grouted. The compound wall of the temple was reset partly as per original pattern after dismantling and removing the damaged portions.

Manipur

167. TEMPLES OF VISHNU, BISHENPUR, DISTRICT BISHNUPUR.—Pointing and plastering work was done. Plinth protection was provided and pathway repaired and the area fenced.

Meghalaya

168. DAVID SCOTT'S MEMORIAL, CHERRAPUNJI, DISTRICT KHASI AND JAYANTIA HILLS.— Stone masonry work was done at damaged portions of compound wall besides pointing of the compound. Cattle proof gate was provided.

Nagaland

169. REMAINS OF FORT, DIMAPUR, DISTRICT KOHIMA.—The remaining work of providing brick-on-edge pathway and levelling and dressing of compound was completed.

Tripura

170. SCULPTURES AND ROCK-CUT RELIEF OF UNAKOTI TKTHA, UNAKOTI KADLASHAR, DISTRICT NORTH TRIPURA.—The cracks in the rock-cut sculptures were filled up and top finished with epoxy

resin mixed with stone dust of original colour and texture.

171. GUNAVATI GROUP OF TEMPLES, UDAIPUR, DISTRICT SOUTH TRIPURA.—The comer towers of the temple no. 1 were restored as per original with special size bricks in lime-.SK/7fc/j*i* mortar. M.S. grill was fixed over the compound wall.

HYDERABAD CIRCLE

Andhra Pradesh

112. MONOLITHIC BULL, LEPAKSHI, DISTRICT ANANTAPUR.— The area around the bull was cleared off and levelled by removing thorny bushes and loose stones and filling with good soil for developing a lawn.

173. CHINTAIA VENKATARAYA TEMPLE, TADPATRI, DISTRICT ANANTAPUR.—The roof, pillars and basal mouldings of the disturbed *kalyana-mandapa* were removed for resetting.

174. RANGINI MAHAL, GURRAMKONDA, DISTRICT CHTTTOOR.—The cavities formed in the stone platforms were underpinned. The missing and old *chhajja* stones were replaced by new ones.

175. SAUMYANATHA TEMPLE, NANDALUR, DISTRICT CUDDAPAH.— The external surface of the *sikhara* was plastered alongwith stucco work, after scraping the external surface, removing loose bricks and underpinning the cavities.

, 176. SIVAKESAVASVAMI TEMPLE, PUSHPAGKI, DISTRICT CUDDAPAH.— The damaged *taki* stone slabs and beams of the terrace were removed and replaced with new ones after duly providing brick jelly concrete with pressed tiles over it.

177. GOLINGESVARA TEMPLE, BICCAVOLU, DISTRICT EAST GODAVARL—-The old and dead lime plaster over the *sikhara* was removed and replastered after restoring damaged portions of the *sikhara.*

178. BHIMESVARA TEMPLE, DRAKSHARAMA, DISTRICT EAST GODAVARL— The existing damaged Madras terrace roof of the first floor of *garbhagriha* was removed and relaid in R.C.C. roof with granite stone flooring. The old and decayed brick veneering on the interior walls of *garbhagriha* was also removed and reset with dressed granite slabs to match the walls. Weathered limestone *linga* with cavities was repaired by filling the cavities with mixture of epoxy resin and limestone powder and treated with P.V. coating.

179. CHAR MINAR, HYDERABAD, DISTRICT HYDERABAD.—The rear side wall portions of the mosque were chemically cleaned. The dead lime plaster of the four minars at the base level upto 2 m height was removed and replastered. The work is in progress.

180. ALAMPUR TEMPLES, ALAMPUR, DISTRICT MAHBOOBNAGAR.— The reconstruction of the *sikhara* and *nandi-mandapa* of Kudali Sangamesvara temple was completed. The original sandstone *dhvaja-stambha* was installed behind *nandi-mandapa.* Sandstone flooring was laid inside the *garbhagriha,* the inner circumambulatory passage and in *gudha-mandapa.* The main deity, Siva-*linga,* of the main shrine and other deities in their respective shrines were reconsecrated. The reconstructed temple was originally existing at the confluence of rivers Krishna and Tungabhadra

at village Kudavalli which is 25 km away from the site of reconstruction at Alampur. The temple was dismantled in 1979 due to threat of inundation under the waters of Srisailam Hydro-electric Dam Project (pis. LXVIII-LXIX).

181. KATESVARALAYAM (DEVI SHRINE), PALAMPET, DISTRICT WARANGAL.— The existing crumbled *mukha-mandapa* and moulded basement was dismantled after numerical and photo documentation, preparation of drawings and plans from various angles. The reconstruction was in progress and restoration had been done upto the *adhishthana* level which is on raft foundation. The latter is filled with plum concrete. The dislodged and sunken *adhishthana* moulding stones were reset in their original position.

182. NANDI-MANDAPA, PALAMPET, DISTRICT WARANGAL.—The reconstruction of *Nandi-mandapa* was completed. The Nandi sculpture which was kept in *mukha-mandapa* of Ramappa temple was shifted and placed in its original position in the *Nandi-mandapa* (pl. LXX).

183. WARANGAL FORT, WARANGAL, DISTRICT WARANGAL.— The fallen outer stone wall of *garbhagriha* of the Jangamaiah temple was reconstructed. The fallen *chhajja* stones were reset. The *root of mukha-mandapa, antarala* and *sikhara* was watertightened.

Karnataka

184. MADRAS A OF MAHMUD GAWAN, BIDAR, DISTRICT BIDAR.—The old and dead lime plaster from the walls was removed and the replastering work over the same is in progress. The decayed lime concrete flooring in first and second floor of the building was removed and relaid partly in cement concrete to be finished in lime plaster. The missing and damaged cement *jalis* of windows were replaced by R.C.C. *jalis* and tinted matching to the original with film of lime mortar.

JAIPUR CIRCLE

Rajasthan

185. MARBLE PAVILIONS AND BALUSTRADE ON THE ANA SAGAR BUND AND THE MARBLE HAMMAM BEHIND THE ANA SAGAR BUND, DISTRICT AJMER.—The decayed plaster of the outer wall towards Saheli Bazar of Anasagar Baradari was removed and replastered.

186. ANCIENT SITE, BHANGADH, DISTRICT ALWAR.—The Work of exposing and underpinning and pointing the structures was in progress. Replastering and recess pointing of the outer wall of *garbhagriha* of Somesvara temple was also done.

187. SIVA TEMPLE, NEELKANTH, DISTRICT ALWAR.— The repairing work of broken and fallen plinth of the platform of Naugaza temple by resettng in R.R. masonry is in progress.

188. SIVA TEMPLE AND RUINS, ARTHUNA, DISTRICT BANSWARA.—The temple was provided with lightening conductor.

189. FORT, BHARATPUR, DISTRICT BHARATPUR.—R.R. stone masonry work in breached portion of the fort wall was taken up.

190. JAWAHAR BURJ, BHARATPUR, DISTRICT BHARATPUR.— Filling in of cuts in the earthen embankment, replacing the broken *chhajja* stones of the pavilion, restoring the retaining walls at the edge under the broken floor was undertaken.

191. NAND BHAWAN, Dig, DISTRICT BHARATPUR.—Preparation of architectural members as per original by dressing of stones for Nand Bhawan was taken up.

192. COLOSSAL IMAGE OF YAKSHA, NOH, DISTRICT BHARATPUR.—The colossal image of Yaksha at Noh was reinstalled at its original place and grill enclosure was also provided around it.

193. PALACE, BUNDI, DISTRICT BUNDI.— Repairs to the damaged and decayed plaster on the walls of the *Chitrasala* and replacement of broken/missing *chhajja* stones were carried out.

194. FORT, CHITTAURGARH, DISTRICT CHITTAURGARH.— Pointing and repairs to the *kanguras* and reconcreting the floors of the Ratan Singh palace were completed.

195. FORT, JAISALMER, DISTRICT JAISALMER.—The work of dismantling and reconstruction of the bulged out and damaged lower fortification work of the fort was taken up.

196. ANCIENT RUINS AND STRUCTURAL REMAINS, KRISHNAVILAS, DISTRICT KOTA.— The buried plinth of the temple was exposed after removing the fallen stone members of Biyan-ki-Baodi and Charkhambha temple. Temporary sculpture shed was constructed in R.R. masonry.

197. RANTHAMBHORE FORT, RANTHAMBHORE, DISTRICT SAWAI MADHOPUR.—The repairs to the roof of the Hamrnir palace is in progress. The work of random rubble masonry and fixing of G.I. sheets to the roof of the Dharamsala near Ganesa temple was also completed. Scientific clearance of the buried structure along the pathway from Andheri Gate to Battis Khambha Chhatri of the fort is in progress.

198. FORT OF KUMBHALGARH, KUMBHALGARH, DISTRICT UDAIPUR.— Approach roads were provided from Bedi Mandir to Siva temple and towards Golerao temple.

LUCKNOW CIRCLE

Uttar Pradesh

199. KHUSRU BAGH, ALLAHABAD, DISTRICT ALLAHABAD.—An iron grill and gate was provided on the southern side of Khusru Bagh to check entry of cattle inside protected area. Lime concrete flooring was done towards south side of the gate.

200. CEMETERIES OF KYDGANJ, ALLAHABAD, DISTRICT ALLAHABAD.— The protected area on south-east side was provided with ornamental iron railing.

201. GARHWA FORT, GARHWA, DISTRICT ALLAHABAD.—The western side fort wall was raised to one metre height after removing broken barbed wire in stone masonry for the safety of the monument and sculptures. Parapet walls of the tanks were raised in stone masonry to check surface water going' inside the tanks.

202. EXCAVATED SITE, SRINGAVERAPURA, DISTRICT ALLAHABAD.—Repairs to the Tank B, Phase

IV were further continued and completed by providing concrete shell below structures and pointing the open joints.

203. ANCIENT SITE, SAHET MAHET (SRAVASTI), DISTRICT BAHRAICH.—Underpinning and reset ting of ancient bricks of Maha Stupa and cells exposed by Indo-Japanese team was completed. An ornamental iron grill was provided around the Bodhi tree site and its *pradakshinapatha* was concreted.

204. SITE OF STUPA AND MONASTERY, PIPRAHWA, DISTRICT BASTL— The work of resetting the ancient bricks in position, pointing open joints and laying of lime concrete was taken up and completed.

205. GULAB BARI, FAIZABAD, DISTRICT FAIZABAD.— Vaulted ceiling of the central hall of the first floor was lime plastered after removing salt affected plaster.

206. NENI KHANAM'S TOMB, FAIZABAD, DISTRICT FAIZABAD.—Lime concrete flooring was done in the ground floor *dalans* and the parapet wall was lime plastered.

207. TOMB OF BAHU BEGUM, FAIZABAD, DISTRICT FAIZABAD.—Thick coating of lime wash over ornamental floral designed lime plaster was scraped carefully and dull whitewash was done to match with the original shade.

208. TOMB OF SHUJA-UD-DAULAH, FAIZABAD, DISTRICT FAIZABAD.— Vaulted ceiling of the ground floor *dalans* around the tomb was plastered after removing dead and salt affected plaster. The lime concrete flooring was also provided.

209. LAKE OF KIRAT SAGAR, MAHOBA, DISTRICT HAMIRPUR.— Open joints of rubble stone masonry of the *ghats* towards south were pointed and the south-east side of Alha-Ki-Baithak was fenced with barbed wire.

210. CHAURASI TOMB OF Loom SHAH BADSHAH, KALPI, DISTRICT JALAUN. —The *dalans* around the central cenotaph chamber were provided with lime concrete. The walls and arches of the *dalans,* east to west and south to north sides, were plastered.

211. JHANSI FORT, JHANSI, DISTRICT JHANSI.—Debris of collapsed cells in the north side of the fort was cleared and the bulged out wall of the cells were taken out for reconstruction. Roads and pathways were repaired. Dry stone pitching was done near the main entrance gate. Rubble stone drains were provided along the existing road inside the fort.

212. RANI LAKSHMI BAI PALACE, JHANSI, DISTRICT JHANSI.— Salt affected and weathered lime plaster having rich moulding and carving on pillars, cornice and walls inside and on outer fa§ade of the palace was removed and replastered matching with original. The outer and inner facade of the palace was given colour wash. The decayed lime plaster inside *dalans* of Rani Mahal was also attended to and white washed.

213. KATCHERI CEMETERY, KANPUR, DISTRICT KANPUR.—Open joints of veneering stones of the graves were recess-pointed. The damaged graves were underpinned and plastered. Barbed wire fencing was also provided over the existing compound wall.

214. BIBIAPUR HOUSE, LUCKNOW, DISTRICT LUCKNOW.— The hanging and broken wooden beams of the ceiling were removed carefully. The weak *lakhauri* brick masonry in door openings of western side verandah was redone in lime mortar to support cracked arches. Underpinning, pointing the open joints and plastering of the rooms was also attended to. Square brick designed moulded lime plaster on the western facade of main building were reproduced. The protected area was fenced with barbed wire on angle iron post.

215. DILKUSHA PALACE, LUCKNOW, DISTRICT LUCKNOW.—The south-east side plinth of palace building was exposed by removing debris and a big *Shisham* tree. The exposed plinth was underpinned and lime plastered reproducing mouldings matching with the original. The open joints of brick masonry were pointed and edging of broken lime plaster of the inner walls of rooms was repaired. Lime plastering the circular moulded brick masonry towards southern facade of the buildings was also done.

216. IMAMBARA OF ASAF'UD-DAULA, LUCKNOW, DISTRICT LUCKNOW.—An arch of rooms in the south-west wing of 1st gateway was reconstructed and walls were underpinned and plastered. Floors were provided with lime concrete. The adjoining four cells. facing south were also repaired by way of underpinning, plastering the walls and lime concreting of the floors. The outer facade of staircase having rich mouldings was repaired. The entire north-eastern facade of the main building leading to Bhul-Bhulaiyan about 24 metres in length and 10 metres in height was replastered matching the original pattern. The adjoining wing of northern *burji* of the main building was underpinned and plastered.

217. KAISER BAGH GATE, LUCKNOW, DISTRICT LUCKNOW.—The south-east comer of the eastern facade was underpinned and the rich mouldings reproduced and lime plastered matching the original.

218. MASJID CONNECTED WITH ASAF'UD DAULAS, LUCKNOW, DISTRICT LUCKNOW.— The entire south-eastern wing abutting the cloister of Asfi mosque which was in dilapidated condition was repaired by way of restoring fallen pillars, underpinning the walls, filling in cracks in arches and ceiling, moulded lime plastering on walls, pillars and ceiling and providing lime concrete on floor on roof terrace. The damaged thick lime plaster on the side walls of the staircase leading to Bhul-Bhulaiyan was restored. The steps towards north-east and south-east sides galleries were under pinned and plastered.

219. NASIR-UD-DIN HAIDER'S KARBALA IN DALIGANJ, LUCKNOW, DISTRICT LUCKNOW— Fresh lime concrete was provided on the roof terrace of lower outer rooms on north, western and south sides after filling in the deep and wide cracks and replacing decayed lime concrete. The decayed and dead lime plaster of parapet walls was replaced with fresh lime plaster.

220. PICTURE GALLERY, HUSAINABAD BARADARI, LUCKNOW, DISTRICT LUCKNOW — The outer facade of the building facing south was underpinned and lime plastered matching with original.

221. RESIDENCY BUILDINGS, LUCKNOW, DISTRICT LUCKNOW.—Compound wall of cemetery was repaired by way of underpinning and moulded lime plastering. In order to prevent from further

damage due to weather effect and ageing, the *lakhauri* brick masonry walls were underpinned, watertightened and pointed wherever necessary,

222. SHAH NAZAF'S TOMB, LUCKNOW, DISTRICT LUCKNOW.— The roof terrace of portico and passage around the tomb was concreted and the facade replastered after removing decayed plaster.

223. SIKANDER BAGH GATE, LUCKNOW, DISTRICT LUCKNOW.— The bulged and broken wall to the east of the mosque was reconstructed after dismantling and lime plaster matching with original. The decayed and weathered lime plaster having rich mouldings was also restored and the opening of cells along the compound wall were provided with iron door shutter.

MADRAS CIRCLE

Kerala

224. FORT ST. ANGELO, CANNANORE, DISTRICT CANNANORE.—The debris of the ruined wall on the north-eastern comer of the fort which is abutting the sea was completely removed and reconstructed as per original.

225. MATTANCHERI PALACE, COCHIN, DISTRICT ERNAKULAM—The decayed wooden members in the roof of Navaratri hall were removed and replaced with new teak wood as per the old designs. Preservative coating was applied to the wooden members after removing moss and lichen. The broken tiles of the roof were also replaced with new ones.

226. TEMPLE OF PARASURAMA, THIRUVALLAM, DISTRICT THKUVANANTHAPURAM.—Accretionary materials like thick coat of lime, bricks, etc., on the walls of the sub-shrine were removed in order to expose original features.

227. SIVA TEMPLE, PERUVANAM, DISTRICT TRICHUR—The decayed wooden members of the tiled roof of *chuttambalam* (cloistered *mandapa)* on its southern and western sides were removed and replaced with new teak wood. The wood members were finally coated with wooden preservative after removing moss and lichen.

228. JAMA TEMPLE, KIDANGANAD, DISTRICT WYNAD.—The out-of-plumb wall on the southern side of the main shrine was completely .dismantled and reconstructed as per original. The leaky terrace of the shrine was watertightened after removing withered course.

Pondicherry

229. SRIMULANATHAR TEMPLE, BAHOUR, PONDKHERRY.—To expose the original plinth level of the main temple an earthwork excavation was carried out A stone apron was also constructed all around the temple.

230. SRI PANCHANADISVARA TEMPLE, THIRUVANDARKOIL, PONDKHERRY.—The broken and witn-ered stucco figures of the *vimana* of the main temple were strengthened by plastering in combination, of hand-ground lime mortar and applied with suitable colour to match with the original.

Tamil Nadu

231. KAILASANATHA TEMPLE, KANCHEEPURAM, DISTRICT CHENGALPATTU M.G.R.—The dislodged and damaged cut stone retaining wall on the northern and eastern sides of the temple was dismantled and reconstructed after making provision for drainage of rain water from the inner *prakara*.

The *pillared mandapa* was provided with a new stone flooring.

232. SHORE TEMPLE, MAMALLAPURAM, DISTRICT CHENGALPATTU M.G.R.—The stone steps leading to the temple were dismantled in order to trace the extent of the newly discovered *prakara* wall.

233. MUNKUDUMISVARA TEMPLE, PONVILAINTHA KALATHUR, DISTRICT CHENGALPATTU M.G.R.—The leaky terrace over the *mahamandapa* and the *mukha-mandapd* was watertightened by removing the old and dead withered courses and by laying a fresh layer of brick jelly with lime concealed by two courses of flat-tiles in cement mortar and finally plastering in combination mortar.

234. NITYAKALYANASVAMI TEMPLE, THIRUVIDANTHAI, DISTRICT CHENGALPATTU **M.G.R.**—The main temple and the *mandapas* were provided with aprons.

235. THIRUPPUUSVARA TEMPLE, VAYALUR, DISTRICT CHENGALPATTU M.G.R.—The work of dismantling and reconstruction of structure 3 was completed after providing suitable foundation. Stone flooring inside structure 3 and 4 was also completed (pl. LXXI).

236. BHAGAVATI TEMPLE, CHTTRAL, DISTRICT KANYAKUMARI,— The damaged and withered plaster on the walls of the *mandapalli* (kitchen) were raked out and replastered. The leaky terrace was watertightened by dismantling the withered courses and laying a fresh brick jelly concrete with lime concealed by two courses of flat tiles in cement mortar and finally plastered in combination mortar with suitable toning. The broken stone door jambs were replaced with new ones and was provided with wooden doors.

237. ROCK-CUT CAVE, THIRUNANDIKKARE, DISTRICT KANYAKUMARI.—In order to prevent erosion of earth, random rubble masonry walls were constructed in cement mortar on the terraces leading to the cave and drains with side walls were provided along the terrace sides to drain off storm water.

238. FORT, VATTAKOTTAI, DISTRICT KANYAKUMARI.—The wooden members of the chambers like door, etc. and the main iron grill gate were provided with two coats of smoke grey enamel paint

239. ST. MARY'S CHURCH, MADRAS, DISTRICT MADRAS.—In order to arrest percolation of rain water into the wall, the leaky vaulted roof was covered by laying bitumen tarfelt over a coat of bitumen primer and finally applied with a coat of bitumen tar.

240. SOMANATHA TEMPLE, MELPADI, DISTRICT NORTH ARCOT AMBEDKAR.— The accietionary walls on either side of the main temple were removed in order to restore the original architectural appearance. To give more support to this main temple, stone lintels and iron girders were installed.

The original flooring of the *mukha-mandapa* was exposed. The undulated stone flooring around the main shrine and the two *gopuras* was dismantled and relaid to match with original.

241. JAINA SCULPTURES AND INSCRIPTIONS ON THE HILL, VALLIMALAI, DISTRICT NORTH ARCOT AMBEDKAR.—The missing stone steps from the entrance of Endowment Office to the foot of the hill were provided with new granite stones of similar size and design. A culvert for narrow stream, across the pathway was constructed. An iron grill gate was fixed at the entrance.

242. SRI JALAKANTHESVARA TEMPLE, VELLORE, DISTRICT NORTH ARCOT AMBEDKAR.—The leaky terrace of the *kalyana-mandapa* was attended with utmost care. The broken main beam was joined by using 6 mm M.S. plate and its grove cut was filled-up with cement concrete. Then the main beam and the pillars were fixed with the help of 12 mm M.S. plate. The joints of ceiling slabs were filled with cement mortar and the terrace was watertightened by laying brick jelly with lime mortar concealed by concrete flat-tiles in cement mortar and finally plastering by specially prepared lime mortar.

243. SRI SIKHANATHASVAMI TEMPLE, KUDUMIANMALAI, DISTRICT PUDUKKOTTAI.—The crumbled *kalyana-mandapa* was completely dismantled and reconstructed as per original. The broken long stone slabs and ornamental stone members were replaced with new ones. The undulated stone flooring was also completely dismantled and relaid.

244. SRI SUNDARACHOLISVARA TEMPLE (SIVA TEMPLE), KULATHUR, DISTRICT PUDUKKOTTAI.—The out-of-plumb *maha-mandapa,* Amman shrine and the ornamental *tirumadil* were completely dismantled and reset to plumb with the original using new stones wherever necessary. The leaky terrace of the *garbhagriha, ardha-mandapa, maha-mandapa,* open pillared front *mandapa* and Amman shrine were watertightened. An apron was provided all around the temple to prevent the seepage of rain water into the foundation.

245. THIRUPPERUMANANDAR TEMPLE, MADATHUKOIL, NANGUPATTI, DISTRICT PUDUKKOTTAI.—The *mukha-mandapa,* Amman shrine and *madapalli* (kitchen) were completely dismantled and reconstructed as per original. The leaky terrace of the *mukha-mandapa,* cloistered *mandapa* and *madapalli* were watertightened. The undulated stone flooring of the main shrine was dismantled and relaid. An earthwork excavation was carried out on the west *prakara* wall of main shrine and the plinth level was exposed.

246. VUAYALAYACHOLISVARA TEMPLE AND GROUP OF SUB-SHRINES AROUND IT, NARTHAMALAI, DISTRICT PUDUKKOTTAI.—The dilapidated sub-shrine on the southern side was dismantled and reconstructed as per original with new stones wherever necessary. The terrace was properly watertightened. The original plinth level of the *nandi-mandapa* was exposed after a small earthwork.

247. ROCK-CUT SIVA AND VISHNU-TEMPLE, TIRUMAYAM, DISTRICT PUDUKKOTTAI.—The accretion-ary brickwork of the cloister *mandapa* was dismantled and the leaky terrace was watertightened by laying brick jelly with lime mortar, concealed by two courses of flat-tiles in cement mortar and finally plastering in combination of specially prepared lime mortar after removing old and withered course. The original plinth level of the main temple was exposed by an earthwork. The *vimana* of the main

sub-shrine was watertightened and the broken portions of stucco figures were mended.

248. FORT WITH BUILDING, ATTUR, DISTRICT SALEM.—The dilapidated bastions on the west, north, and north-west side comer were dismantled and reconstructed as per the original by making use of old stone blocks wherever available. Earthwork excavation was carried out near the upper bastion in order to expose the original features and reconstruction of the same to a certain level was completed.

249. CHANDRANATHA JAINA TEMPLE, METTUPUDUR, DISTRICT SALEM.—The broken structural members like beams, slabs, etc., of *maha-mandapa* roof were replaced with new ones while the broken beams with sculptured panels were mended by using a dovel and rich cement mortar. The accretionary brickwork on the outer wall of the *navaranga-mandapa* was dismantled and replaced with a stone veneer with the core filled with cement concrete. The leaky terrace over the *maha-mandapa* and a part of the *navaranga* were watertightened by removing the withered courses and by laying a fresh brick jelly layer with lime and concealed by two courses of flat tiles in cement mortar and finally plastered in combination mortar.

250. MURUGANATHASVAMI TEMPLE, THIRUMURUGANPOONDI, DISTRICT SALEM.— The eastern *tirumadil (prakara* wall) was provided with an ornamental coping with designs matching with the original. An apron was provided all around the main shrine and the Amman shrine. The *maha-mandapa* was provided with a new stone flooring.

251. JAINA TEMPLE, THIRUMALAI, DISTRICT THIRUVANNAMALAI SAMBUVARAYAR— The withered portions of the *vitnana* and the *gopura* were strengthened by underpinning after removing the dead mortar, filleting the joints and finally plastering of specially prepared lime mortar. The withered stucco figures were strengthened and the matching colour was also done.

252. FORT COMPLEX AND TEMPLES, GINGEE, DISTRICT SOUTH ARCOT.— The leaky terrace of Kalyanamahal was watertightened by laying a fresh brick jelly in lime mortar concealed by tiles in cement mortar and finally plastering by hand grind lime mortar after removing dead and withered courses.

253. TOLEGIRISVARA TEMPLE, PANAMALAI, DISTRICT SOUTH ARCOT.— The dilapidated Ganesa shrine was completely dismantled and reconstructed as per original. The work of watertightening of the leaky terrace *vimana* of the Amman Shrine was also carried out.

254. SIVAGANGA LITTLE FORT, THANJAVUR, DISTRICT THANJAVUR.— After removal of jungle growth and decayed bricks, the fallen and missing portions of upper rampart wall on the western side was reconstructed. The plastering at the ornamental portion on the same side of the rampart wall and the pointing works wherever necessary were also carefully carried out

255. SIVA TEMPLE, VALKANTAPURAM, DISTRICT TIRUCHY—The damaged wall of *mukha-mandapa* and its undulated stone flooring were dismantled and reconstructed. The leaky terrace of the southern *gopura* was watertightened after removing the old and withered courses and by laying brick jelly with lime concealed by two courses of flat tiles in cement mortar and finally plastering in combination of

specially prepared lime mortar. The tank of the temple was desilted and its damaged stone steps were reconstructed with available rough stones.

256. BHAKTAVATSALA TEMPLE, SERMADBVI, DISTRICT TKUNELVELI KATTABOMMAN.—The leaky terrace of the *ardha-mandapa* and *mukha-mandapa* was watertightened by dismantling the damaged withering course materials and laying fresh brick jelly concrete with lime concealed by two courses of flat-tiles with cement mortar mixed with water-proofing compound and finally plastered with combination mortar, suitably toned. The accretionary lime wash over the walls, ceiling, etc., of the *ardha-mandapa* were removed by using suitable chemicals and the original features were exposed. The wooden members of the false ceiling inside the sanctum were provided with two coats of wood preservative.

MINI CIRCLE, GOA

Goa

257. FORT AGUADA, CANDOUM, DISTRICT NORTH GOA:—The rank vegetation over the walls of upper fort was removed. The inner walls of the water tank were whitewashed.

258. MAHADBVA TEMPLE, CURDI, DISTRICT SOUTH GOA.— To commence the reconstruction of the old temple a masonry platform of 720 x 530 m was constructed to a height of 30 cm above the existing ground level.

259. BASILKA OF BOM JESUS AND CHAPEL OF ST. FRANCIS XAVIER, OLD GOA, DISTRICT SOUTH GOA.—Broken marble slabs of the floor inside the main church were carefully removed and relaid matching with the existing ones.

Two collapsible gates were fixed to the southern and eastern entrances of the chapel of St. Francis Xavier. The decayed wooden planks of the first floor verandah were removed and replaced with new ones. The inner walls of the main church were repainted with oil bound distemper and those, the sacresty with white acrylic emulsion paint. Outer walls were given coating of super snowcem.

The dilapitated laterite rubble compound-wall was rebuilt with seasoned laterite blocks in combination mortar.

260. CHURCH OF OUR LADY OF THE ROSARY, OLD GOA, DISTRICT SOUTH GOA.— The decayed wooden beams and rafters and broken tiles of the roof on east and west sides were removed and replaced with new ones. Two coats of super snowcem were applied on the exterior walls.

261. CHURCH OF ST. CAJETAN, OLD GOA, DISTRICT SOUTH GOA.—TWO coats of super snowcem were applied to the frontage of the church.

262. SE CATHEDRAL, OLD GOA, DISTRICT SOUTH GOA.— The dilapidated structure in the residential complex of the church was removed and reconstructed with, seasoned laterite stones in combination mortar.

263. SAFA MASJID, PONDA, DISTRICT SOUTH GOA.—The laterite. stone floor of the platform in the north-western comer of the water cistern was re-laid. The platforms[1] over the middle arches on

the northern side were restored with laterite blocks matching with existing one.

The decayed wooden rafters and broken tiles of the mosque roof in north-western comer were carefully removed and raplaced with new ones.

A culvert over the adjacent nallah towards main road was constructed, the abutment walls of which were built of seasoned laterite, over which 15 cm thick RCC slab was laid.

MINI CIRCLE,

SHIMLA *Himachal*

Pradesh

264. LAKSHNA DEVI TEMPLE, BHARMOUR, DISTRICT CHAMBA.—The electric wiring of the temple was taken up and completed.

265. MANI MAHESH TEMPLE, BHARMOUR, DISTRICT CHAMBA.— The work of reconstruction of out-of-plumb and damaged walls of the platform was taken up.

266. CHAMUNDA DEVI TEMPLE, CHAMBA, DISTRICT CHAMBA.— The work of replacing the old electric wiring was taken up and completed.

267. LAKSHMI-NARAYANA GROUP OF TEMPLES, CHAMBA, DISTRICT CHAMBA.— Drain around the temple was provided with flagstone. The work of flooring of the compound with flagstone was taken up.

268. BAUNATH TEMPLE, BAUNATH, DISTRICT KANGRA.—The weathered and damaged pillar was replaced as per original. Providing and laying cement concrete after removal of marble slab flooring and refixing the same was taken up and completed.

269. RUINED FORT, KANGRA, DISTRICT KANGRA.— The work of providing base concreting in front of the Lakshmi-Narayana temple was taken up and the construction of the sculpture shed completed.

270. ROCK-CUT TEMPLES, MASRUR, DISTRICT KANGRA.—The work of concreting the roof top of the temple was taken up and completed. The construction of breast wall was completed. The work of providing support pillar to the overhanging portion of the-roof was taken up.

271. FORT, NURPUR, DISTRICT KANGRA.—The work of providing and laying concrete base and course rubble stone masonry work of the bastion was done to avoid further damage.

272. HIDIMBA DEVI TEMPLE, MANALI, DISTRICT KULLU.—The decayed wooden planks of the second tier was dismantled and refixed to match with the original. The work of concreting the drain on the back and north-south side of the temple was also completed.

273. GAURI-SHANKAR TEMPLE, NAGAR, DISTRICT KULLU.—The work of reconstruction of back side wall was completed and support wall on the east side and steps leading to Lakshmi-Narayana temple provided.

274. BUDDHIST MONASTERIES, TABO, DISTRICT LAHAUL AND SPOT— The decayed wooden members of the roof terrace of the Go-khang *(zelma)* were replaced by new ones as per original and

the roof wateitightened. Outer foundation of the *Duwang* was stabilized by providing stone apron. The decayed and pulverized-plaster of the outer walls were raked out and replastered besides providing flooring to the porch.

The damaged roof of the Phoo-Gumpha was also repaired and the work of providing approach road was also taken up.

275. ARDHANARISVARA TEMPLE, MANDI, DISTRICT MANDI.—The work of providing flagstone apron around the temple was taken up and completed.

276. PANCHAVAKTRA AND BATUKA BHAKAVA TEMPLE, MANDI, DISTRICT MANDI.—Resetting of the out-of-plumb, dislodged and cracked *sikhara* of the Batuka Bhairava temple was taken up and completed by consolidating and strengthening the core (pl. LXXII). The compound in front and back sides of the temple was also concreted.

277. TRILOKINATH TEMPLE, MANDI, DISTRICT MANDI.—The construction of the retaining wall from *baoli* to Hanumana temple on the back side of the temple was completed and M.S. grill gate provided. The dislodged and out-of-plumb miniature *sikhara* temple was dismantled and re-set as per original after base concreting (pl. LXXIII).

SRINAGAR CIRCLE

Jammu and Kashmir

278. MARTAND TEMPLE, RANBIRPORA, DISTRICT ANANTNAG.— Re-pairing the peristyle was further continued and all accumulated earth from the peristyle, particularly on the main entrance side, was removed and dislodged stones were taken down. After resetting the dislodged stones, the core filling of the peristyle was done with available stones and after trimming old stones in proper shape were fixed on the veneer of peristyle on the southern side. Besides, a miniature shrine on the eastern side which was taken up for repairs was also completed by providing moulded veneering stones on the exterior. The core of the miniature temple was filled with the available random stones and top was covered with ashlar masonry.

279. MUGHAL ARCADE, VERINAG, DISTRICT ANANTNAG.—After completing the masonry work and lime concreting on the roof of the arcade the broken and dislodged lintels and brackets were prepared and fixed in their original position. Steps for providing railing around the spring were taken. The work is to be continued.

280. STUPA, PARMASPURA, DISTRICT BARAMULLA.—In continuation of the previous year's work *(1988-89,* p. 162) repairs to the steps on the western side were taken up (pl. LXXIV). The-accumulated earth and the loose stones were removed and the core was filled up with the available random rubble stones. The missing steps were restored and dislodged balustrade was repaired. The fallen dragons provided on the western side were also fixed in their original position.

281. MONASTERY, PAREHASPURA, DISTRICT BARAMULLA.— The platform on the northern side which had become dislodged with the passage of time was pulled down and was reset as per the original. The work is to be kept in progress.

282. CHAITYA, PARIHASPURA, DISTRICT BARAMULLA.—The moulded stones on the sides of the steps and the platform wall of the *chaitya* were partly restored with the available stones as per the original. The work is in progress (pl. LXXV)

283. EXCAVATED REMAINS AND ANCIENT SITE, USHKURA, DISTRICT BARAMULLA.—To expose its hidden structures and to conserve them subsequently, the accumulated debris from the sides of the stupas was removed with a view to trace the probable extent of the hidden structures, if there are any.

284. MOSQUE AND OTHER ANCIENT REMAINS, WULAR LAKE, DISTRICT BARAMULLA.— While removing thick vegetation, traces of the *mihrab* of the mosque built in *lakhauri* bricks and sculptural friezes of temple were found.

285. KHANPUR SARAI, KHANPUR, DISTRICT BUDGAM.—To avoid any kind of encroachment, the area of the sarai was fenced and cells nos. 2,3,4, and 5 on the western side which were badly damaged were taken up for repairs. The dislodged walls were strengthened in *lakhauri* bricks and tiles, falling plaster was edged and strengthened and missing portion of the walls were made good as per the original.

286. AKHNOOR FORT, AKHNOOR, DISTRICT JAMMU.—Repairs to the buttress wall of the fort from the east side were continued further for strengthening the fort wall facing the river Chenab.

287. GROUP OF ANCIENT TEMPLES, BILLAWAR, DISTRICT KATHUA.— The *sikhara* portion of the temple was leaking and grouting therefore was done to stop leakage. The temple was provided with regular apron from all sides as per original traces. Besides, stone flooring was also done in the *mandapa* and the *parikrama* of the temple was also provided with stone flooring.

288. TISSERU STUPA, LEH, DISTRICT LEH.— Repairs to the eastern side stupa terraces were carried out as per the original (pl. LXXVI). The terraces were provided with cement concrete mixed with *marcula* on the eastern side to stop water percolation. The high exterior wall of the platform was also plastered.

289. LEH PALACE, LEH, DISTRICT LEH.—Three rooms which had fallen down were re-laid by replacing decayed and missing wooden rafters and beams. Above it, twigs were laid and the top was . watertightened. The missing and damaged windows were provided as per the original.

290. AVANTISVAMI TEMPLE, AVANTIPORE, DISTRICT PULWAMA.— Out-of-plumb stones, and weathered and damaged portions of the temple plinth on the south side were removed. The temple plinth was repaired with the available old stones. The work is in progress (pl. LXXVII).

291. AVANTISVARA TEMPLE, AVANTIPORE, DISTRICT PULWAMA.— Repairs to the basement and steps on the western side were taken up. The subsidiary structures on its right and left flank on western side were also taken up for repairs. The work is in progress (pl.(LXXVIII).

292. ANCIENT TEMPLES, LADHUV, DISTRICT PULWAMA.—The damaged fencing of the temple was repaired and a proper wicket gate was provided for proper watch and ward and a chowkidari shed was also built.

293. KATHI DARWAZA, SRINAGAR, DISTRICT SRINAGAR.—The leaking roof was watertightened, the cracks were stitched and recess pointing was done as per the original.

294. MOSQUE OF AKHOON MULLA SHAH, SRINAGAR, DISTRICT SRINAGAR.—A dwarf parapet wall was built in the 'dalan' upto a height of 0 60 metres to a length of 17 metres for the safety of the visitors. The accumulated debris from *Wazuh* tank was removed. The work is in progress.

295. BADSHAHTOMB, SRINAGAR, DISTRICT SRINAGAR.—The damaged boundary wall of the tomb was repaired and the burial of Zindposh was rebuilt. Besides, a proper stone approach pathway was laid and repairs to entrance of the royal burial were also carried out.

296. ANCIENT TEMPLE, BOHRI KADAL, DISTRICT SRINAGAR.— The steps leading to the temple which were in a deteriorating condition were repaired as per the original.

297. BUDDHIST SITE, HARWAN, DISTRICT SRINAGAR.—The fencing of the ancient site which was in progress was completed. The old shed was provided with grill doors and windows for the safety of terracotta tiles.

298. GROUP OF TEMPLES, NARANAG (1ST GROUP), WANGATH, DISTRICT SRINAGAR.—All the fallen stones of the gateway were properly documented and removed and rebuilt with the fallen material. Besides, repairs to retaining wall adjoining to the gateway was also taken up and completed.

299. GROUP OF TEMPLES, NARANAG (2ND GROUP), WANGATH, DISTRICT SRINAGAR.— All fallen stones of temple no. 2 Were removed properly after documentation and temple was repaired as per the original. Besides, repairs to the spring were also carried out; damaged sculptures and sculptural fragments were extracted during desilting. By the side of the source of the spring on the rock surface carved *lingas* in narrow niches were also encountered.

300. GROUP OF ANCIENT TEMPLES, BABOUR, DISTRICT UDHAMPUR.—In continuation of previous year's work *(1988-89,* p. 164) repairs to the front wall of the *mandapa* of the Dera temple were continued as per the original traces and the work is still in progress. To stop erosion of soil and to divert flow of water a dry pitch masonry retaining wall of the Kala Dera I temple which was taken up during the last financial year was completed. Besides, repairs to the floor of the *mandapa* was also carried out.

The *mandapa* wall of the Kala Dera II temple facing east was restored with the new stones as per the original.

301. GROUP OF TEMPLES, KIRAMCHI, DISTRICT UDHAMPUR.— The ornamental stones, of the *sikhara* and *antarala* portion of Temple 4 were fixed and repairs of the platform wall were taken up simultaneously. The accumulated earth from the platform was removed and stone flooring was provided as per the traces available. The platform wall on the southern side was restored only in core masonry as per the original (pl. LXXLX).

302. PURANA MAHAL, RAMNAGAR, DISTRICT UDHAMPUR.—To strengthen the walls of the rooms and to repair the north-western comer of the fort wall, the repairs were carried out on the fortification wall of the palace complex (pis. LXXX-LXXXI) and simultaneously arched entrances of the rooms

were also repaired. The steps leading to the first floor of the complex, which were in a very bad shape, were also repaired and restored. In addition to this repairs on the southern side particularly on the servants' quarters were also carried out by way of rebuilding the missing brick walls, providing a wooden roof and parapet wall on the terrace

303. FORT, RAMNAGAR, DISTRICT UDHAMPUR.—Repairs to battlements of the fort were carried out besides stitching the cracks in the fort wall.

VADODARA CIRCLE

Daman and Diu

304. CHAPEL OF OUR LADY ROSARIO AT MOTI DAMAN, DAMAN. — The dead plaster of the walls was removed and new plaster was provided. The worn-out glazed window shutters were replaced by new shutters.

305. FORT WALL, MOTI DAMAN, DAMAN.—In continuation of last year's work *(1988-89,* p. 164) removal of vegetation including cutting of trees and shrubs was continued besides dismantling and reconstruction of portions of rubble masonry wall after removal of tree roots. The wall was underpinned with rubble stones set in lime concrete mortar. The missing decorative wall cornice was also reconstructed as per original. The top portion of the wall was watertightened after filling in the cavities with rubble stone masonry. A layer of lime cement concrete was laid to prevent any damage.

306. RUINED CHURCH NEAR N.W. CORNER AT MOTI DAMAN, DAMAN. — Underpinning and watertightening of deteriorated walls with rubble masonry was carried out after removal of tree roots, plants, shrubs, etc. The debris from surrounding area of the church was removed.

307. FORT AT DIU. — The sunk and dilapidated stone flooring was dismantled and reset wherever necessary. Pointing was also carried out.

Gujarat

308. AZAM MUAZZAM RAUZA AT AHMEDABAD, DISTRICT AHMEDABAD.— In continuation of last year's work *(1988-89,* p. 165) the remaining dead lime concrete of the flooring was removed and fresh layer of lime concrete was laid giving fine finish. Similarly, corroded expanded metal jalis and worn-out wooden members of window were replaced by new ones. Suitable oil painting coats were also applied.

309. JAMI MASHD, AHMEDABAD, DISTRICT AHMEDABAD.— The weathered ashlar masonry of south and east sides of courtyard and of domes was removed and new stone masonry was provided with original mouldings and pattern. Missing *chhajja* and *merlons* were provided. The broken lintels were removed and replaced with new ones. The domes were watertightened with a layer of concrete.

310. GREAT TANK, PALACE AND HAREM AT SARKHEJ, AHMEDABAD, DISTRICT AHMEDABAD.—The tilted and out-of-plumb ashlar stone masonry steps of the great tank on the east side and the palace were dismantled and reconstructed. Weathered architectural members were replaced with new stone with original mouldings. Dead lime concrete of the roof was removed and fresh layer of lime cement concrete was laid to make it watertight.

311. MUNSOR TALAV AND SHRINES, VKAMGAM, DISTRICT AHMEDABAD.—In continuation of last year's work *(1988-89,* p. 165) the bulged and sunken ashlar stone masonry of miniature shrines and steps was dismantled and reconstructed by replacing the decayed, worn-out and missing stones, wherever necessary. The fallen and scattered architectural members were collected and set in their original places.

312.- DARBARGARH AT SIHOR, DISTRICTBHAVNAGAR.—The bulged wall was carefully dismantled and reconstructed and plastered.

313. PRADYAMNAJI TEMPLE, DWARKA, DISTRICT JAMNAGAR.—The southern and eastern sides of the *sikhara* were dismantled upto *chhajja* level and reconstructed replacing worn-out and weathered stones with original mouldings and carvings. The *jangha* layer of the temple was also dismantled and reset in plumb after replacing the worn-out members.

314. PURSHOTTAMJI TEMPLE, DWARKA, DISTRICT JAMNAGAR.— In continuation of last year's work *(1988-89,* p. 165) the ashlar masonry of *sikhara* and small shrines was dismantled and reconstructed replacing weathered stones with mouldings and carvings as per original.

315. KHAPRA KODIA CAVES AT JUNAGADH, DISTRICT JUNAGADH.—The compound wall's height has been raised to prevent misuse of the monument.

316. SURYAKUND.MODHERA, DISTRICT MEPSANA.—In continuation of last year's work (1988-*89,* p. 166) the sunken steps and worn-out ashlar stone masonry including hearting masonry was dismantled and reconstructed with old and new stones duly dressed as per original (pl. LXXXII).

317. SUN TEMPLE, MODHERA, DISTRICT MEHSANA.—In continuation of last year's work *(1988-89,* p. 166), the missing pillars, capitals and lintels were provided with imitation of original carvings and set at their respective places. The missing small *debris* was provided with original carvings and mouldings. The roof was watertightened.

318. MALAIMATA TEMPLE, PALODAR, DISTRICT MEHSANA. The missing ashlar stone masonry and flooring was provided with original mouldings and carvings. Out-of-plumb ashlar masonry was dismantled carefully and was reset by replacing the worn-out and weathered members. The work is in progress.

319. RANI-KI-VAV, PATAN, DISTRICT MEHSANA.—The work of providing missing ashlar stone masonry with mouldings as per original was carried out. The work is in progress.

320. TEMPLE OF MAHADEVA, KANKANPUR, DISTRICT PANCHMAHALS. — Wire fencing of demarcated area was carried out.

321. BAWA MAN'S MOSQUE, PAVAGADH, DISTRICT PANCHMAHALS.—In continuation of last year's work *(1988-89,* p. 166) the missing ashlar masonry was provided. The tilted and out -of-plumb ashlar masonry was dismantled and reconstructed. Rubble masonry was also constructed wherever necessary.

322. FORT WALL, PAVAGADH, DISTRICT PANCHMAHALS.— The tilted and out-of-plumb ashlar masonry and dead RR masonry was dismantled and reconstructed (pl. LXXXIII).

323. KEVDA MASJID, PAVAGADH, DISTRICT PANCHMAHALS.— The work of providing missing ashlar masonry of the walls and *chhajja* with original mouldings was continued. The roof was made watertight. The work is in progress.

324. MAKAI KOTHAR, PAVAGADH, DISTRICT PANCHMAHALS.—The missing rubble masonry was restored and the roof was made watertight.

. 325. NAVLAKHA TEMPLE, SEJAKPUR, DISTRICT SURENDRANAGAR.—Prior to dismantling, broken lintels, capitals of dome *sabha-mandapa* were given masonry supports to prevent collapse of the dome. New stones are being dressed for replacement.

326. SHAHR-KI-MASJID, PAVAGADH, DISTRICT PANCHMAHALS.—[1] The masjid was provided with chain and link wire fencing.

MONUMENTS MAINTAINED BY THE STATES

ANDHRA PRADESH

1. The enclosure wall of the *gajasala* of the Kondapatti fort was conserved by the Department of Archaeology and Museums, Andhra Pradesh.

Assam

The Department of Archaeology, Government of Assam, carried out the following conservation works:—

1. BEZOR DOL, DISTRICT DIBRUGARH.—The dome was repaired by uprooting the trees and laying lime-concrete.

2. RAIDONGIA TEMPLE, DISTRICT DIBRUGARH.—The cracks in the dome were thoroughly grouted and the exterior repaired. An apron was also provided around its plinth to prevent percolation of rain water.

3. VISHNU TEMPLE, ASWAKRANTA, DISTRICT KAMRUP.— The old apron around the Vishnu-Janardana temple was removed and relaid with lime-concrete.

4. HAYAGRIVA-MAHADEVA TEMPLE, HAJO, DISTRICT KAMRUP.—The cement plaster on sculptures in the dome was removed and the core of the dome was repaired using lime-concrete.

5. MANIKARNESVARA-TEMPLE, NORTH GUWAHATI, DISTRICT KAMRUP.— The old brick-rampart was salvaged by removing earth deposits and partly repairing the structures.

6. SIDDHESVARA TEMPLE, SUALKUCHI, DISTRICT KAMRUP;— The vegetational growth from the dome was removed and the extrados was plastered.

7. NA-PUKHURI DOL, DISTRICT SIBSAGAR.—The vegetation growth was cleared from the dome.

8. PHUKUWA DOL, DISTRICT SIBSAGAR.—The stepped plinth of the structure was repaired using old bricks.

DELHI

1. BRITISH CELL AT PROBYN ROAD, DELHI.—' Conservation of the monument was completed including fixing of the grill at the main entrance.

GUJARAT

The Department of Archaeology, Government of Gujarat, carried out conservation work at the following monuments:

1. RAJGHADHI MOUND, UMTA, DISTRICT MEHSANA.
2. STEP-WELL, CHORIVAD, DISTRICT SABARKANTHA.
3. STEP-WELL, DHOLIVAV, DISTRICT SABARKANTHA.
4. SARNASVAR MAHADEVA TEMPLE, ABHAPUR, DISTRICT SABARKANTHA.
5. STEP-WELL, HAMPUR, DISTRICT SURENDRANAGAR.

MANIPUR

The Department of Archaeology, Government of Manipur carried out conservation work at the following monuments:

1. CHAITHAPHAM, LANGTHABAL, DISTRICT IMPHAL.— The work of removing dead mortar and pulverized bricks and replacing them was completed. The protected area was fenced with barbed wire on angle-iron posts.

2. HAOMACHA PUKHRI, LANGTHABAL, DISTRICT IMPHAL.—The tank was dewatered for removal of dirt and weeds. During the course of dewatering a wooden canoe was found at the bottom of the tank which was removed and after chemical treatment is now kept on display at the Manipur State Museum.

MEGHALAYA

1. CHISOBISRA HISTORICAL SITE, RONGENGRL, DISTRICT EAST GARO HILLS.
2. BORGHAT ROYAL TEMPLE, BORGHAT, DISTRICT JAINTIA HILLS.
3. MEGALITHIC SITE, IEW SHILLONG (LAITL YNGKOT), DISTRICT EAST KHASI HILLS.
4. LYNGKYRDEM MONOLITH SITE, DISTRICT EAST KHASI HILLS.
5. MOOSNIANG, KJDMMOOSNIANG JOWAI, DISTRICT JAINTIA HILLS.
6. NARTIANG SITE, DISTRICT JAINTIA HILLS.

NAGALAND

The Department of Art and Culture, Government of Nagaland, preserved the following monuments:

1. THE WOODEN SCULPTURE, SHANGYU, DISTRICT MON.

2. THE SECOND WORLD WAR TANK AT KOHIMA TOWN.
3. HISTORICAL SITES, CHUNGLIYIMTI, DISTRICT TUENSANG.
4. DISPLAY OF HUMAN SKULLS, CHUI, DISTRICT MON.
5. JINA. AND EDIBEN MEMORIAL AT MONGCHEN, DISTRICT MOKOKCHUNG.
6. SOPFUNUO MEMORIALS, RUKHROMA. DISTRICT KOHIMA.

TAMIL NADU

The Department of Archaeology, Government of Tamil Nadu, carried out conservation work at the following monuments :

1. JEENASVAMY TEMPLE AT TIRUPARUTHI KUNRAM, DISTRICT CHINGLEPUT.
2. PALACE BUILDING AT THANJAVUR.
3. RAMALINGAVILASAM AT RAMANATHAPURAM.
4. SWASTIKA WELL AT TIRUVELLARAI, DISTRICT TRICHUR.
5. THIRUMALAI NAICKER PALACE AT MADURAI.

X. EXPEDITIONS OUTSIDE INDIA

CENTRAL ARMED FORCES MUSEUM, LUANDA, ANGOLA

The re-organization of the Central Armed Forces Museum, Luanda, Angola was undertaken by the Survey under the supervision of Munira Khatun assisted by D.R. Gehlot, M.K. Joshi, Kishan Singh, Vipari Vidyasagar, Vajanla Veeraswamy, Medidam Rama Kotesvara Rao, I.M. Tikku, Badri Prasad, Fakhruddin and Gajraj Singh. This was the first-ever project of the Government of India in Angola.

The Museum is located in the fortress of Sao Miguel which was built by the Portuguese after defeating the Dutch colonizers in 1648. This seventeenth century fortress, overlooking the Atlantic Ocean, was found to be in a very bad state of preservation, being constantly exposed to the effects of humidity, seepage of water and salinization. This needed restoration and conservation. A museum was set up in the fortress much later by the Portuguese colonizers in the first half of the twentieth century and has in its collection, objects comprising arms and armaments, sculptures, architectural pieces, various coins and silver ritual church objects besides other miscellaneous items. From the old photographs made available by the Angolan authorities, the museum looked like a storehouse. Later, the galleries of this museum were dismantled and the collection was kept in storage by the Angolans after their independence. Subsequently, prehistoric tools, weapons of modem warfare, relics of the struggle for Angolan independence and objects related to Dr. Antonio Agostinho Neto, the Angolan national hero, were added to the collection.

Based on the scheme prepared in 1986 by the Survey for restoration and reorganization of the museum, it was decided to entrust the work to a team from the Survey. Although their main task was reorganization of the museum galleries, it included some essential items of structural conservation of part of the fortress where the museum is housed. The materials required for the purpose of restoration and reorganization, which were not available in Angola were brought from India and the Angolan Government provided construction materials which are locally available. Under the scheme, four galleries were to be set up,, viz., (1) Pre-history and Colonial Gallery in which pre-historic artefacts, colonial arms and Angolan martial heritage were to be displayed; (2) Restoration of a chapel in its original from in which religious objects were to be displayed; (3) Comrade Agostinho Neto Gallery in which objects belonging to the great leader and freedom fighter and photographs of his activities were to be arranged; and (4) Struggle for Freedom Gallery in which relics and photographs of liberation movement were to be organized. The proposal for setting up of a fifth gallery with the relics of the present war in the building, which is now used as a store-room, was given up due to certain difficulties of the museum authorities, conservationists, chemists, carpenters, masons, photographers, draughtsmen and electricians from the Survey.

Prior to starting the work for treatment of objects a carpentry workshop and photo studio were set-up. The work also entailed extensive repairs and re-fixing of loose decorative tiles in the rectangular structure, repairs and repainting of galleries, classification of exhibits after studying the old records, accessioning of newly acquired objects, preparation of show-cases, planning and organizing the galleries.

organizing the galleries.

In the Pre-history and Portuguese Gallery (pl. LXXXIV), a large double T'-shaped show-ease along the southern wall, five show-cases on the northern wall besides seven free-standing pedestals were made for display of objects. In this Gallery, pre-historic tools found from Luanda and its neighbourhood, arms and armaments (pl. LXXXVA), military badges, medals and miscellaneous other objects belonging to colonial (Portuguese) period, and Angolan martial heritage were displayed (pl. LXXXVB). The missing windows were re-made and replaced and the Hall was given two coats of paint of yellow buff colour. The floor was repaired and covered with jute carpet.

In the Chapel two show-cases were prepared one for display of a banner and the other for display of an ivory figure of Jesus Christ The altar was renovated and three wooden figures were re-displayed on pedestals. The Chapel was given two coats of bluish green paint after treating the salt-affected areas. Jute carpeting was provided to the floor. Curtains were hung for restoring its original character.

The Comrade Agostinho Neto Gallery was organized to commemorate the life and activities of the Angolan national hero and the first President of the People's Republic of Angola, Dr. Antonio Agostinho Neto (1933-1979). Various objects belonging to Comrade Neto and photographs showing his eventful life were displayed in this Gallery (LXXXVI). A thematic display was also planned for this Gallery to highlight different aspects of the personality and achievements of Comrade Neto.

The Struggle for independence Gallery was organized in a rectangular structure with vaulted roof on four sides and a quadrangle in the centre, which was covered with wooden bars in criss-cross design allowing sunlight and air inside. The dado of the hall is panelled with decorative blue glazed tiles depicting various scenes of early colonial period besides flora and fauna of Africa. The hall was in a very bad state of preservation due to humidity, seepage of water and salinity. The ceilings and walls were full of cracks of all descriptions, the floor was broken and uneven, the tiles were bulging out from the wall and many of them had pulverized and were missing from their original places. All the cracks were repaired, matching tiles were searched out, arranged and re-fixed to their original position. The damaged floor was repaired and proper lighting arrangement was made -by providing concealed wiring. The walls and the ceiling were given coats of primer and white paint.

The objects displayed in this gallery comprise relics of war and struggle for Angolan independence besides relevant documents and photographs. They cover a period of approximately nineteen years from 10th December, 1956 when the MPLA (People's Movement of Liberation of Angola) upto 11th November, 1975 when independence of Angola was proclaimed after fighting the battle of Kifangondo.

Fifteen free-standing show-cases and nineteen pedestals, screens and stands were prepared/ renovated for display of objects.

Individual and general labels in Portuguese were also prepared and fixed at suitable places along with maps and plans. General lighting of the galleries and interior lighting of the show-cases was

done with concealed wiring. The floors of all the galleries were covered with jute carpets. All the objects were reaccessioned. Isometric views of the galleries were prepared showing location of the exhibits along with their accession numbers.

The Museum being located in an ancient seventeenth century fort has problems of chronic dampness and termites.

Due to non-availability of materials, particularly for anti-termite treatment measures for safety and security of the exhibits and upkeep and maintenance of the museum galleries were suggested to the Museum authorities for follow-up action.

PRESERVATION OF ANGKOR VAT TEMPLE, SIEMREAP, CAMBODIA

STRUCTURAL CONSERVATION.— In continuation of the previous year's work *(1988-89,* pp. 169-170), the Survey resumed the work of structural conservation and chemical cleaning and preservation of the Angkor Vat temple Complex, under a bilateral agreement. The Indian team was led by C.L. Suri, the other members of the team being C. Bhatia, V. Khare, H.L. Raina, A.C. Chakravarti, S.N. Sharma, C. Rangappa, S.S. Chaudhary, K.K. Swamakar, V. Lokanathan, M.U. Qureshi, Tahir Malik, K.G. Rangarajan, M.N. Vishwanath, S.M. Bisnalkar, R. Manjrule, and B.R. Rajput. The work of reconstruction of the superstructure of the gallery above its plinth was taken up in the third phase and eight pillared bays of the gallery were re-erected and covered with semi-vaulted roof. This was a rather difficult task since gallery had been dismantled and partly reconstructed by the French about two decades ago and the work was beset with problems. Since dismantling had been done earlier by a different agency, the team had to take up the work without having seen the structure prior to dismantling and in the absence of the graphic and photo-documentation records prepared by the French before dismantling and the rather confusing method adopted for numbering of architectural members, haphazard stacking of the dismantled architectural members in the vast open area of the first terrace as well as in the area outside this terrace where the stone members were lying in heaps, many without any numbers.

The topmost course of the moulded facade of the plinth reconstructed by the French also does not follow a horizontal level but gradually rises in the centre. The level obtaining in the centre is, thus, about 5 centimetres higher than that obtaining at the southern and northern ends of the gallery which posed a problem in the re-erection of the front pillars of the gallery in proper alignment and level. Chiselling of the raised pillar marks provided on the plinth had to be therefore resorted to upto the required level for proper erection of the pillars. It also required dismantling and resetting the original floor of the gallery in conformity with the present level of the topmost course of the moulded facade of the plinth. It was further observed that during re-erection of the rear pillars of the gallery, the original base marks for the pillars were lost due to the provision of a retaining wall below the pillar level by the French. Further, the top surface level of the retaining wall was higher by about 5cms than the base level of the pillars. The top surface of the retaining wall had to be chiselled upto the required level for the proper erection of the pillars, cross beam, capital and beam keeping a watchful eye on

the verticality and alignment of the pillars. This often involved dismantling and re-erection of the pillars and other members two or three times. The French conservators had also provided three 2.5m deep catch-pits connected with each other with a pipe perforated at the top along the outer rear wall of the gallery, with arrangement for draining out the storm water from the vast open and covered area inside the third enclosure, through pipes laid below the foundation of the rear wall. The arrangement is not satisfactory as it falls short of the requirement. Provision of a surface drain along the rear outer walls of the galleries in the area between the 3rd and 2nd enclosures had to be made besides taking other experimental measures for draining out seepage water.

From the section drawing published in *Angkor Wat En Peril* by Albert Le Bonheur, it appears that the original vaulted roof of the gallery laid by corbelling of roof stones was to be replaced by the French Conservators by a vaulted roof in R.C.C. with the help of a ring beam to be provided on the topmost course of the entablature or the cornice level and the carved roof stones were to be cut into thin slabs and fixed on the R.C.C. vault as an ornament, a measure which was adopted by them in another temple called Vat Adviya.

The work of reconstruction of the gallery (alongwith the adjoining pavilions on the north and south) has been completed upto the topmost cornice level, and eleven pillared bays involving the re-erection of a row each of 11 front and 11 rear pillars, surmounted by cross beams, capitals and front and rear beams have been restored and covered with roof stones of the semi-vault. Three courses of stone blocks of the entablature upto the cornice level were restored and the facade of the gallery is complete except the vault

Two courses of stone blocks were also mounted on the rear wall of the gallery upto the cornice level.

In all, 5 pillars and 2 beams of the gallery had either decayed beyond repair or were found missing. These had to be recast in R.C.C. as sandstone is not quarried at present. It was, however, ensured that they match the original pillars in colour and texture. Outlines of decorative motifs carved on the original pillars and beams were also reproduced on the R.C.C. members.

Only a few courses of the vaulted roof now remain to be laid after assessing the amount of damage done to the architectural members of the roof by the French conservators by way of cutting the stones into thin slabs.

Portions of the libraries between the second and third enclosures, which had dislodged from their position and had wide open joints in the dry stone masonry, the affected and required to be dismantled and reset properly.

As it was not possible to take the crane inside the third enclosure, it was decided to have a gantry prepared for the execution of this work. The preliminary work of numbering and indexing of stones, preparation of detailed drawings and photographic documentation was completed..

This work of dismantling and resetting of porches on the north, south and east sides of third

enclosure was also taken up.

Before dismantling, the stones were carefully numbered, detailed drawings of the porches were prepared and the numbers were transferred to the drawings to facilitate proper identification and resetting of stones. Detailed photographic documentation was also done for the purpose.

After dismantling and proper stacking of the sandstones, the laterite core was attended to by cleaning, chiselling and replacing of decayed blocks by new ones. Compacting and filling up of the wide gaps between the laterite blocks was done. This was followed by relaying of the stones in their proper position, level and alignment. Recess pointing of stone joints in cement mortar 1:3 with a mixture of crushed stone dust was done to render the structures watertight

The following porches were dismantled and reset in the manner detailed above.

In this operation, the central porch on the northern side, the northern porch on the north-eastern comer, the eastern porch on the north-eastern comer (one decayed pillar of this porch was replaced by a R.C.C. pillar matching the original in colour and texture), a small porch, north of the central porch, on the eastern and southern sides and the central porch on the eastern side were dismantled and reset.

The work of dismantling and resetting of eastern Embankment and steps of the moat north of the First Causeway was also taken up. All the dismantled left over stones of the steps were identified, the missing stones were replaced by new ones, chiselled and dressed so as to fill in the gaps.

One 14.65 m long, sandstone step, which was left half finished was also laid alongwith a stretch of 14.65 metres long coping stones on top.

A further stretch of the highly disturbed and sunken stepped embankment, 17 metres in length, was dismantled and reset after preparing three stepped terraces, each provided with a 20 cm thick cement concrete base.

A catchpit of brickwork was made at the back of these steps to receive the storm water. This was connected with a cross drain running under the steps for draining of the storm water into the moat.

The vaulted roof of the southern and eastern galleries and porches of the third enclosure with the exception of Samudramanthana gallery and the adjoining pavilions on the north and south, was rendered watertight by grouting and pointing of the interior and exterior surfaces.

An apron, 32 metres long and 1.5 m wide, was laid along the base of the plinth of the northern gallery. Besides, the porches on the east, north and south which were dismantled and reset, were provided with apron around them.

Observations made during the fourth working season at Angkor Vat have revealed that the original drainage channels cut into the stones at the plinth level across the galleries are too small and inadequate for quick drainage of rain water from the vast open and covered areas inside the third enclosure. Consequently, the area between the 2nd and 3rd enclosures, which is unpaved and open to the sky gets flooded during heavy rains, allowing the water table to rise abnormally. The fully

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soaked sandy sub-soil which is washed out through wide stone joints is prone to slipping. This results in uneven subsidence of foundations.

With a view to ensuring quicker drainage of storm water surface drains were provided along the rear walls of the galleries in the open area between the 2nd and 3rd enclosures.

For quick drainage of seepage water to prevent abnormal rising of water table, an experimental ring well was provided at a distance of about 3 metres from the central catch-pit provided by the French behind the Samudramanthana gallery. This well is proposed to be connected by a cement pipe with the catch-pit at a depth of 25 m (Due to the rising of the watertable and consequent slipping of soil in the first half of June 1990 the pipe connection between the well and the catch-pit could be provided at a depth of about 1.6 metre only.)

Based on the success of the experimental well, the Cambodian authorities have agreed to sink identical wells, at regular intervals, connected with one another by perforated pipes, on all sides in the open area between the 2nd and 3rd enclosures.

CHEMICAL PRESERVATION. — The work of chemical treatment, taken up in the eastern and southern corridors of the third enclosure involved eradication of cryptogamic vegetation like moss, lichen and algae; removal of dirt and dust, etc.; eradication of plants with roots; treatment with fungicide, and application of a coat of preservative on the areas chemically treated. The chemicals used in the work were 1 to 5% aqueous ammonia with teepol B-300; 1 % sodium pentachlorophenate zinc silicofiuoride; and 1 to 2% preservative coat like that of polymethyl methacrylate/Dynasilane BSM-40+S.

The entire area of southern corridor, both exterior and interior of third enclosure was subjected to chemical treatment. Similarly, the eastern corridor of third enclosure both exterior and interior, except the portion of Samudramanthana gallery and the adjoining pavilions on the north and south, were chemically treated. The western corridor of first enclosure was taken up for chemical treatment; however, after cleaning an area of 700 sq m of the southern half of the high plinth and the exterior of the southern half of the corridor, the work was discontinued due to non-functioning of water-lifting pump.

In the cruciform gallery, small portions of the vaulted roof on the east and west and crown of porch in the southern wall were given a coat of Dynasilane BSM-40 in 2% strength and 1% solution of Polymethyl Methacrylate on experimental basis.

XL ARCHAEOLOGICAL CHEMISTRY

TREATMENT OF MONUMENTS AND PAINTINGS[1]

ANDHRA PRADESH

1. RAMESVARASVAMI TEMPLE, TADIPATRI, DISTRICT ANANTAPUR.—Chemical treatment work was carried out to eradicate vegetation growth on the stone surface with the help of a diluted mixture of a base and a neutral detergent. Lime and sooty accretions have also been removed using suitable chemicals and solvents. After thorough cleaning and washing, the surface was subjected to fungicidal treatment followed by the application of preservative coat after complete drying of the surface.

2. CHENNAKESAVASVAMI TEMPLE, SOMAPALLI, DISTRICT CHITTOOR.— The remaining untreated area of the paintings was subjected to chemical cleaning and modelling work. Old translucent preservative coat and sooty accretions were removed with the help of suitable solvents and chemicals. Filleting and edging work were also attended to alongwith colour matching work.

3. SRTVIRABHADRASVAMI TEMPLE, MACHERLA, DISTRICT GUNTUR.—The paintings on the ceiling and beams in 12 panels with thick lime coating were treated. These paintings are datable to sixteenth-seventeenth century AD.

4. CHARMINAR, HYDERABAD, DISTRICT HYDERABAD.—Chemical treatment work was initiated on this monument during the period under review in order to eradicate vegetational growth. Dilute solution of ammonia and teepol has been used for the purpose.

5. THOUSAND-PILLARED TEMPLE, HANAMKONDA, DISTRICT WARANGAL.— Chemical treatment was carried out on the remaining untreated portions for the removal of lime wash, hard deposits of calcareous material and other accretions. Chemico-mechanical method was adopted and dilute solution of acetic acid, oxalic acid, sodium hexameta phosphate, ammonia and teepol were used for the purpose. 3% solution of Acrypol-P in -toluene was finally applied over the treated surface as a preservative.

ARUNACHAL PRADESH

6. MALDOTHAN TEMPLE, LJKABALI, DISTRICT LAKHIMPUR— The coat of synthetic paint over the image of Mahishamardini was removed by using di-acetone alcohol, turpentine and carbon tetrachloride. After removal of paint, 5% polyvinyl acetate-in toluene was applied as a preservative and 1% sodium-penta-chlorophenate to prevent fungicidal and bacterial growth.

The other four sculptures, also of granite, were first cleaned with plain water; thereafter, 5% aqueous ammonium hydroxide solution with teepol was applied to eradicate lithophylic vegetational

[1] information from the Director (Science) of the Survey except items 3 and 6 which are from the Department of Archaeology and Museums, Andhra Pradesh and Director of Research, Arunachal Pradesh.

growth and the broken parts of the sculptures were fixed by synthetic adhesives. Finally, preservative coat was given as in the first sculpture.

The sandstone sculptures were first brushed lightly and washed in plain water; After these were dry, 2% polyvinyl acetate in toluene was applied to bind the fragile portions of the sculpture. 5% ammonia with teepol was applied to eradicate lithophylic vegetation and fungi. For removal of salts, paper pulp treatment was given. Finally, preservative coat as in above cases was given.

ASSAM

7. BISHNUDOL TEMPLE, GAUKISAGAR, DISTRICT SIBSAGAR.—Chemical cleaning and preservation work was taken up on the temple for the removal of biological accretions with the help of aqueous solution of ammonia and a neutral detergent. After cleaning, washing and drying, fungicidal treatment of 2% solution of zinc- silicofluoride was given and finally a preservative coat was applied thus completing 60% of the work.

8. DEVIDOL TEMPLE, GAURISAGAR, DISTRICT SIBSAGAR.— The outer stone structure which was badly affected from vegetational growth and deep-rooted microphytes was subjected to chemical treatment for the eradication of the same. Aqueous solution of dilute ammonia mixed with a neutral detergent teepol was used for the purpose. At some places, dilute solution of oxalic acid was also used in order to remove deep-rooted microphytes. After treatment, washing and drying of the surface, 2% aqueous solution of sodium pentachlorophenate was sprayed on the surface as a fungicidal treatment.

9. RANGGHAR PAVILION, JOYSAGAR, DISTRICT SIBSAGAR.~-Chemical treatment and preservation work was continued on the remaining untreated area for the removal of vegetational growth. A mixture of dilute solution of ammonia and teepol was used for the softening of accretions which were later removed by mild scrubbing with soft brushes. At some places, dilute solution of oxalic acid was also used for removal of deep-seated microphytes which could not be removed by previous chemical formulation. Two coats of 2% aqueous suspension of zinc-silicofluoride were given on the treated area as a fungicide which was followed by application of 4% solution of PVA in toluene as a preservative.

BIHAR

10. STUCCO FIGURES AT TEMPLE NO. 3, DISTRICT NALANDA.—Restoration work of 23 stucco figures in the temple No. 3 was carried out with the help of white cement, plaster of Paris and steel rods according to the need. Colour matching was also done wherever required. A preservative coat was finally applied on the treated and restored figures to minimize the effects of natural deteriorating agents.

11. SHER SHAH SURI'S TOMB, SASARAM, DISTRICT ROHTAS.—Chemical treatment work was carried out in order to remove vegetational growth with the help of ammonia solution, oxalic acid solution and teepol. After treatment, the monument was preserved with 2% aqueous suspension of

zinc-silicofluoride as a fungicide and PMMA solution in toluene as a preservative.

12. ASOKAN PILLARS AT RAMPURVA, DISTRICT WEST CHAMPARAN.— Chemical cleaning and preservation work was taken up on this pillar in order to remove thick growth of moss and lichen using 5% aqueous solution of ammonia with mild scrubbing by nylon brushes. Dilute solution of oxalic acid had to be applied for the removal of dark patches of accretions. After treatment, thorough washing and drying, 2% aqueous solution of sodium pentachlorophenate was sprayed twice to resist the vegetational growth. A preservative coat of Acrypol solution in toluene was finally given thus completing the work.

DAMAN AND DIU

13. DAMAN MONUMENTS, DAMAN.— Panel and canvas paintings in the church of Holy Lady of Remedy at Moti Daman fort were subjected to chemical treatment for the cleaning of darkened vanish, dust and dirt accretions. Suitable chemicals and solvents were used for this purpose and the paintings were finally preserved.

DELHI

14. DIWAN-I-KHAS, RED FORT, DELHI.— The arches and the pillars made of marble with inlay work and golden ornamental designs on the structure of the central hall were severely affected by thick deposits of dust, dirt, soot and greasy matter. These accretions were removed by using organic solvents such as butyl alcohol, xylene, triethanolamine and methyl alcohol. The marble surface bereft of paintings and ornamental designs was cleaned using a mixture of liquor ammonia and teepol in 1: 0.5 percent concentration. Some isolated stains were removed using hydrogen peroxide (pl. LXXXVIII). The work is in progress.

15. RANG MAHAL, RED FORT, DELHI.— The paintings on the under surface of the arches on the western side, the inlay works on the marble surface in the central hall and the stucco work studded with mirrors in Rang Mahal were subjected to chemical treatment for the removal of .thick deposits of dust, dirt and sooty matter. Organic solvents like methyl alcohol, acetone, diacetone alcohol, etc., were used for the decorated work while the plain marble surface and stucco work were cleaned using teepol, ammonia mixture in 1% concentration. Treated area were finally preserved with 2% solution of polyvinyl acetate in toluene.

16. INDIAN WAR MEMORIAL MUSEUM, RED FORT, DELHI.— Blood stains on the displayed objects and woolen 'Daries' were removed using suitable solvents and chemicals. Besides, fumigation and insecticidal treatments were also carried out in the museum.

17. HUMA TON'S TOMB, NEW DELHI.—The south-western comer of entrance of Humayun's tomb which is built of red sandstone and marble was treated chemically for the removal of thick growth of algae, dust and dirt accretions using teepol, ammonia mixture in 2:1 ratio. Stains and other accretions were removed with hydrogen peroxide solution. The treated area was given a coat of 1% of sodium pentachlorophenate as a fungicide followed by a preservative coating with 2% solution of polymethyl methacrylate in toluene.

18. ROSHANARA BARADARI, ROSHANARA BAGH, DELHI.— The paintings hidden under the thick lime wash coat on the arches on the south-western comer of central hall were exposed by chemico-mechanical process using 1 to 2% solution of glacial acetic acid and picking up the softened lime particles with the help of arrow-shaped stainless steel needles. The exposed paintings were then cleaned using organic solvents like methanol and cellosolve. Finally, the chemically cleaned exposed paintings were preserved with 2% solution of polyvinyl acetate in toluene. The work is in progress.

19. SIKANDAR LODI'S TOMB, NEW DELHI.—The algal infested *burjis,* pillars and parapet wall of this structure were subjected to chemical treatment for the removal of algal growth, dust and dirt accretions using ammonia-teepol mixture in 2% concentration. The treated area was given fungicidal treatment with 1 % solution of sodium pentachlorophenate followed by application of a preservative coat of 2% solution of polymethyl methacrylate in toluene.

GUJARAT

20. SIDI SAYYID's MOSQUE, AHMEDABAD, DISTRICT AHMEDABAD.—The outer north and east walls of the monument were chemically cleaned using 2% solution of liquid ammonia and teepol for the eradication of dried moss and lichen. Treated area has finally been preserved.

21. RANI-KI-VAV, PATAN, DISTRICT MEHSANA.—The stone sculptures and beautiful decorations of this excavated site were treated with suitable solvents and chemicals in order to remove thick incrustations of biological and lime deposits. After proper cleaning and thorough washing, the surface was given fungicidal treatment using 2% suspension of zinc silicofluoride and then preserved.

22. JAMI MASJID, PAVAGARH MONUMENTS, CHAMPANER, DISTRICT PANCHMAHALS.— The stone sculptures and decorated work of outer structure of the Jami Masjid were given chemical treatment using a mixture of 3% solution of non-ionic detergent and ammonia in order to remove thick biological growth. Dilute solution of acetic acid was also used for the removal of lime accretions. Treated and cleaned area was later given a fungicidal treatment thus completing 50% work.

HIMACHAL PRADESH

23. HARI RAI TEMPLE, CHAMBA, DISTRICT CHAMBA.— Chemical treatment was carried out to the outer walls and the entrance gate of the temple for removal of vegetational and lime accretions using chemico-mechanical method. 1% aqueous suspension of zinc silicofluoride was sprayed on the cleaned surface as a fungicide which was followed by application of a preservative coating.

24. LAKSHANA DEVI TEMPLE, BHARMAUR, DISTRICT CHAMBA.- -Chemical treatment work was taken up on outer surface of the main gate of the temple which was covered with thick layer of paint, grease, smoke, dust and dirt. A series of organic solvents and chemicals have been used for this purpose and finally insecticidal treatment and preservative treatment was given.

25. SIVA AND SANDHYA GAYATRI-TEMPLES, JAGATSUKH, MANALI, DISTRICT KULLU.— The Siva temple, a small structure of grey sandstone profusely covered with moss, lichen, mud and thick layer of lime was treated chemically with the help of ammonia-teepol solution and dilute glacial acetic acid for the removal of vegetational and lime accretions respectively .After proper cleaning and thorough washing, the surface was given fungicidal treatment with 1% zinc-silicofluoride suspension and preserved with 2% polymethyl methacrylate solution in toluene.

Sandhya Gayatri Devi temple which is situated near the Siva temple is partly built up of stone and partly of wood. The stone portion was subjected to chemical cleaning for removal of vegetational growth and lime wash and finally preserved. The wooden portion was treated with a series of organic solvents and chemicals for the removal of different types of accretions such as paint, soot, grease, oil, etc. The wooden structure was given insecticidal treatment and finally preserved with 1% PVA solution.

JAMMU AND KASHMIR

26. Sun Temple, Martand, District Anantnag.— The work of chemical treatment was carried out on the loose sculptures lying in the courtyard, sculptures and ornamental designs on the plinth wall and the four subsidiary shrines oh the four comers of the temple. 2-3% aqueous solution of ammonia and teepol was used for the removal of thick vegetational accretions. Treated area was finally given fungicidal and preservative treatment.

27. SANKARACHARYA TEMPLE, SRINAGAR, DISTRICT SRINAGAR.— Chemical treatment work was carried out on the exterior walls of the main *sikhara* and parapet walls around circumambulatory path for the removal of thick growth of vegetation using 2% aqueous solution of ammonia and teepol. The treated area was given an application of 1 % aqueous suspension of zinc-silicofluoride as a fungicide and finally preserved with 2% solution of PMMA in toluene.

KARNATAKA

28. TIPU SULTAN PALACE, BANGALORE, DISTRICT BANGALORE.— Chemical treatment and restoration work was taken up on the beautiful paintings of the palace. Filleting, filling of edges, etc., and colour integration were also done. The work is in progress.

29. GOMATESVARA STATUE, KARKALA, DISTRICT NORTH CANARA.—General treatment was given to the statue for the removal of superficial accretions of vegetation. A preservative coat was also applied on the treated surface. The work has been completed.

30. MADHUKESVARA TEMPLE, BANAVASI, DISTRICT NORTH CANARA.— Chemical treatment and preservation work was undertaken on the remaining portion of the temple for the eradication of moss and other vegetational growth alongwith oily and sooty accretions with the help of suitable chemicals and solvents in required concentration. The work has been completed.

31. AMRITESVARA TEMPLE, AMRUTPURA, DISTRICT CHIKMAGLUR.— Restoration work of damaged and broken sculptures was carried out by refixing the detached pieces of sculptures and filling the edges.

32. GROUP OF TEMPLES, LAKKUNDI, DISTRICT DHARWAR.— Vegetational growth and lime accretions were removed with the help of suitable chemicals. Fungicidal treatment was given thereafter to ensure non-recurrence of vegetational growth which was followed by a preservative coating.

33. DARIA-DAULAT BAGH, SRKANGAPATNA, DISTRICT MANDYA.—The old translucent preservative coat, dust, dirt, etc., have been removed from the murals by chemical treatment. Thereafter, a fresh coat of preservative has been applied on the murals. Murals of eastern verandah have also been attended and some consolidation work was done wherever required.

34. LAKSHMINARAYANA TEMPLE, HOSAHOLALU, DISTRICT MANDYA.— Chemical treatment work was carried out in order to eradicate vegetational growth, red ochre and lime wash accretions. Fungicide and preservative coats have also been applied. The work has been completed.

35. PANCHAKUTA BASADI, HUMCHA, DISTRICT SHIMOGA.— This monument which was badly effected with vegetational growth, lime-wash, oily and sooty accretions was subjected to chemical treatment and preservation work to remove accretions and to preserve the monument.

KERALA

36. SANKARANARAYANA. SHRINE, VADAKKUNATHAN TEMPLE, TRICHUR, DISTRICT TRICHUR.— The dust, dirt and muddy accretions from the wooden bracket figures were removed using ammonia and teepol in water in proportion 3:1. Cracks were filled up using saw dust admixed with fevicol. Flytox, an insecticide, was sprayed over the cleaned areas and 'Touchwood' diluted in toluene was applied as a preservative coat.

The painted surface in the shrine was covered with smoke, soot, oily matter, etc. These were removed using triethanolamine, diacetone alcohol, butyl lactate and morpholine either individually or in combination depending upon the type of accretions. Turpentine was used as a restrainer. The entire area was then preserved with 2% polyvinyl acetate in toluene. About 124sq metres of area has been chemically cleaned and preserved.

MADHYA PRADESH

37. KANDARIYA MAHADEVA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.— The *maha-mandapa* (exterior south phase) of the temple badly effected by moss and lichen growth as well as lime wash coating was subjected to chemical treatment using dilute solution of ammonia, teepol and acetic acid respectively. The cleaned areas were treated with 2-3% aqueous solution of sodium pentachlorophenate and finally preserved with 3% polyvinyl acetate solution in toluene. The total area of the *maha-mandapa* thus preserved is 1025 sq. metres.

38. VAMANA TEMPLE, KHAJURAHO, DISTRICT CHHATARPUR.—The chemical treatment work for the removal of dried moss and lichen and lime wash deposits on the sanctum fa§ade and upper portion of the *mandapa* was taken up. About 440 sq. metres of area has been chemically cleaned and preserved. The work is in progress.

39. SIDDHESVARA TEMPLE, NEMAWAR, DISTRICT DEWAS.—The work of chemical cleaning for the eradication of micro-vegetational growth from the exterior surface including the *sikhara* of this temple was taken up. Dilute solution of ammonia and teepol was used for this purpose while dilute solution of acetic acid was used for the removal of lime and red ochre accretions. The work is in progress.

40. BAGH CAVES, BAGH, DISTRICT DHAR.— The badly damaged portions of rock-cut sculptures in the eastern aisle of Cave No. 2 have been repaired using fresh cement mortar mixed with filler, stainless steel mesh and strips as reinforcing materials. Bulged out portions have been consolidated wherever found necessary and cracks etc., have been filled.

Fumigation and insecticidal treatment were also given in Cave 2,3 and 4 using aluminium phosphide and ethylene dibromide to expel bats. Formaline mixture in toluene was used to control insect activity on the paintings.

41. TOMB OF MOHAMMAD GHAUS, GWALIOR, DISTRICT GWALIOR.— Chemicai treatment and preservation work was taken up on the exterior surface of the main dome, its base portion, four *chhatris,* comices, etc., in order to clean biological growth. A mixture of dilute ammonia and teepol was used for softening the accretions for safe removal by soft nylon brushing. The layers of lime wash coatings wherever found were removed by chemico-mechanical means using *1%* solution of acetic acid. Cleaned surface was given a fungicidal treatment by spraying *2%* sodium pentachlorophenate and finally preserved with *2%* polymethyl methacrylate solution in toluene.

42. SAS TEMPLE, GWALIOR, DISTRICT GWALIOR.—The intricately carved stonework on the exterior of the temple was treated with 5% aqueous solution of ammonia and teepol for the removal of vegetational growth. Other accretions of lime and coal-tar were also removed using dilute solution of acetic acid and suitable organic solvents. The thoroughly cleaned surface was given fungicidal treatment using *2%* sodium pentachlorophenate solution and finally preserved with *2%* PMMA solution in toluene.

MAHARASHTRA

43. BIBI-KA-MAQBARA, AURANGABAD, DISTRICT AURANGABAD.— Chemical treatment work was carried out on marble, red sandstone and stucco structure with the mixture of aqueous solution of ammonia and teepol. Aqueous solution of formaldehyde and chloramine\T was also used for the removal of hard accretions. 3% of aqueous suspension of zinc-silicofluoride was applied as a fungicide on the treated and washed surface followed by application of a preservative coat of 3% polyvinyl acetate solution in toluene.

44. ROCK-CUT CAVES, ELLORA, DISTRICT AURANGABAD.—Paintings in the *garbha-griha* of Cave 12 were subjected to chemical treatment for the removal of hard accretions of soot, dust and old varnish coat Suitable solvents and chemicals have been used as per requirement depending on the type of accretions. Stone sculptures of Cave No. 16 were also treated with ammonia-teepol solution for the removal of superficial dust, dirt accretions.

45. TRYAMBAKESVARA TEMPLE, TRYAMBAKESVAR, DISTRICT NASK.— The vegetational growth badly affecting the temple surface was removed by using aqueous solution of ammonia and teepol. After cleaning and thorough washing, fungicidal treatment was given followed by application of a preservative coat of 2-3% solution of acrypol-P in toluene.

ORISSA

46. DAKSHA PRAJAPATI TEMPLE, BANPUR, DISTRICT PURL— The north side of the *deul* was subjected to chemical treatment with the use of ammonia and teepol mixture for the removal of vegetational growth. Patches of lichen which did not yield easily to the treatment, were covered with cotton soaked in above chemicals and then removed with the help of nylon brushes. The chemically cleaned area was finally treated with 1-2% methyl methacrylate solution in toluene. The work has been completed.

47. BRAHMESVARA TEMPLE, BHUBANESWAR, DISTRICT PURL— The *pidhas* of the *jagamohana* which were covered with thick layers of dried moss and lichen were treated with dilute ammonia and teepol mixture for the removal of the accretions. The fungicidal and preservative treatment have been given to preserve the treated surface.

48. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT PURL—The chemical treatment for the removal of dried vegetational growth of moss and lichen alongwith other tenacious accretions was further continued on the top of *bhogamandapa* and side wall of *the jagamohana* facing north side. The work is in progress.

49. LORD JAGANNATHA TEMPLE, PURI, DISTRICT PURL—The deplastered area of *vimana,* I6metres above the spring level was taken up for the removal of lime plaster accretions by chemico-mechanical means using dilute solution of acetic acid. Treated and cleaned area have been preserved by spraying a coat of fungicide and applying a preservative coat. About 80% work has thus been completed.

50. JALAKRIDA MANDAPA, LORD JAGANNATHA TEMPLE-COMPLEX, DISTRICT PURL—The deplastered surface of the *jalakrida mandapa* was subjected to chemical treatment by chemico-mechanical means for the removal of lime plaster accretions using dilute acetic acid with soft scrubbing. The *mandapa* has been given the fungicidal treatment as well as a preservative treatment. The work has been completed.

51. SURYANARAYANA TEMPLE, LORD JAGANNATHA TEMPLE-COMPLEX, DISTRICT PURL— The deplastered surface of the temple having lime plaster accretions was treated with dilute acetic acid solution to remove the tenacious lime plaster accretions by physico-chemical means. Treated area has been given a fungicide coat and two coats preservative thus completing about 90% work.

52. SUN TEMPLE COMPLEX, KONARAK,- DISTRICT PURL—The chemical treatment work was taken up from the top of *the jagamohana* as well as on the south sides of the remains of the main temple using mixture of dilute ammonia and teepol mixture. The Surya images were also treated for the removal of dust, dirt arid oily accretions. Oxalic acid has also been used at some places to bleach red streaks on the sculptures to some extent. About 700 sq. metres area was cleaned during the period. The work is in progress.

PONDICHERRY

53. SRIMOOLANATHA SVAMI TEMPLE, BAHORE.—Chemical treatment and preservation was carried out in order to-eradicate vegetational growth and to remove yellow wash, lime wash and deposits of cement mortar by chemico-mechanical means. Broken portions have been restored and complete area was finally preserved with 5% PVA solution in toluene.

TAMIL NADU

54. SHORE TEMHJE, MAHABALIPURAM, DISTRICT CHENGAIANNA.— Exterior walls and *antarala* of the Somaskanda shrine of the shore temple was taken up for the chemical treatment and preservation work for the eradication of vegetational growth with the help of a mixture of ammonia and teepol solution (3:1). Soluble salts were extracted with the help of paper pulp and distilled water till the surface became free of soluble salts. The entire surface thus cleaned and made salt free was subjected to fungicidal and preservative treatment. Besides general preservation, consolidation of fragile portions was also done with 10% PVA solution in toluene.

55. KAILASANATHA TEMPLE, KANCHEEPORAM, DISTRICT CHINGLEPUT.— The sculptures in the courtyard of Mahendravarman shrine and the front subshrines of the temple were subjected to treatment with dilute aqueous solution of Ammonia and teepol for sufficient time to soften the dried hard accretions of vegetational growth enabling easy removal by mild brushing without damaging the surface of the sculptures. After thorough washing, 1% aqueous solution of sodiumpentachlorophenate was sprayed as a fungicide and finally after complete drying of the surface, 3% Acrypol-P solution in toluene was applied uniformly as a preservative.

56. BRIHADISVARA TEMPLE, GANGAIKONDACHOLAPURAM, DISTRICT TIRUGHIRAPALLI.— The chemical treatment and preservation work was continued on the remaining portion of the stone structure of the *gopura* for the removal of vegetational growth using ammonia solution and teepol in the ratio of 3:1. The treated and cleaned area has been given fungicidal treatment with 2% aqueous solution of sodium pentachlorophenate and finally the entire dried surface was preserved with 3% Acrypol-p (876 G) solution in toluene.

57. ROCK-CUT JAINA TEMPLE, SITTANNAVASAL, DISTRICT THIRUCHIRAPALLI.—The paintings in the interior of the main shrine, verandah, walls and canopy were subjected to chemical treatment using triethanolamine, diaceton alcohol, methanol and toluene etc., with turpentine as a restrainer for the removal of old and aged preservative coat. The broken edges, cracks, etc., have been filleted by means of plaster of Paris tinted with suitable colours. Colour matching and integration work was also carried out to some extent. Insecticidal treatment was also given prior to preservation and consolidation of the paintings by spraying dilute solution of Hytox in carbon tetra chloride. All the treated areas including the sculptures have been preserved with 2% solution of PVA in the toluene.

UTTAR PRADESH

58. ITMAD-UD-DAULA'S TOMB, AGRA, DISTRICT AGRA.—In order to remove superficial accretions of dust, dirt, soot and other tarry matter, chemical treatment was carried out on the. canopy and upper minarets of the monument using mixture of chemicals like ammonia, teepol and hydrogen peroxide in appropriate proportion as per requirement. Organic solvents like triethanolamine and methanol were also used, wherever required for the removal of tarry matter and soot while a pack of aluminium silicate and magnesium trisilicate was used for the removal of sticky particulate deposits.

59. TAJ MAHAL, AGRA, DISTRICT AGRA.—The chemical treatment was carried out on the exterior marble surface of the main building which was effected with dust, dirt, soot and other particulate deposits imparting the structure an unpleasant look. The treatment was carried out by using a mixture of aqueous ammonia, hydrogen peroxide, teepol and triethanolamine solutions in different proportions as per demand of the problem. A pack of magnesium trisilicate and aluminium silicate was also applied wherever found necessary to remove sticky particulate matter.

60. DARGAH OF SHEIKH SALIM CHISTI, FATEHPUR SIKRI, DISTRICT AGRA.— The marble structure which was covered with dust and din, soot and greasy matter, etc. was subjected to chemical treatment using 1 -2% mixture of aqueous solution of ammonia, teepol and hydrogen peroxide in the ratio of 3 :2:1. A mixture of triethanolamine and methanol (2% in water) was also used wherever found necessary.

61. KHUSRU TOMB, ALLAHABAD, DISTRICT ALLAHABAD.—The exterior walls and dome of Prince Khusrau's tomb were subjected to cheinical cleaning for the removal of moss and lichen using 2.3% mixture solution of ammonia and teepol. The fungicidal treatment with *2%* zinc silicofluoride followed by the application of a preservative coating of 2% PVA solution in toluene was given.

62. GROUP OF TEMPLES, DWARHAT, DISTRICT ALMORA.— The chemical treatment work for the removal of moss and lichen from the exterior walls of the temple was carried out with the help of 2-3% solution of ammonia and teepol mixture. Treated area was given a fungicidal treatment by spraying 2% suspension of zinc silicofluoride in water followed by the application of a preservative coat of 2% solution of PVA in toluene.

63. JHANSI FORT, JHANSI, DISTRICT JHANSI.— The chemical treatment work was taken up on the fort for the removal of multicoloured advertisements in oil and acrylic emulsions. Suitable organic solvents and chemicals have been used for the purpose depending on the problems. After chemical cleaning a 2% suspension of zinc silicofluoride was sprayed as a fungicide followed by a coat of 2% PVA in toluene as a preservative.

64. BARA IMAMBARA, LUCKNOW, DISTRICT LUCKNOW.— The lime-plastered wall of the main building was chemically treated for the removal of moss and lichen using a mixture of ammonia and teepol in 2-3% concentration. Treated and cleaned surface was subjected to fungicidal treatment with 2% aqueous suspension of zinc silicofluoride followed by a preservative coat of 2% solution of PVA in toluene.

65. STUPA AND MULAGANDHAKUTI, SARNATH, DISTRICT VARANASI.—The chemical treatment and preservation work was taken up on the Kot stupa, Asokan shelter, votive stupa and stone sculptures for the removal of thick layer of moss and lichen by applying 2% solution of ammonia in water. Dilute solution of oxalic acid was also used to remove colouration due to deep rooted microphytes. After final washing with teepol *(2%* in water) and water, surface was allowed to dry. Fungicidal treatment (2% solution of zinc silicofluoride in water) and a preservative treatment (3% solution of Acrypol in toluene) was finally given to the surface.

66. LAL KHAN'S TOMB, VARANASI, DISTRICT VARANASI.— The work was continued on the remaining untreated area for the removal of moss and lichen by applying *5%* solution of ammonia mixed with little teepol. At some place *5%* solution of oxalic acid had to be used for the removal of colouration due to deep seated microphytes. After thorough washing and drying, the treated surface was given a coat of fungicide and a preservative coat

WEST BENGAL

67. HAZARDUARI PALACE MUSEUM, MURSHIDABAD, DISTRICT MURSHIDABAD.— The oil painting named "Burial of Sir John Moore" (3.5 m x 4.87 m) which had been cleaned and relined earlier using wax resin mixture was attended to for restoration work. The missing portions were filled with handmade paste and were colour matched according to the demand of the painting. At some places, colour matching was done to bring out the proper scheme of colours in projection. The painting was finally preserved with mastic varnish.

Armoury items were also attended to for the cleaning and preservation work, 90 books were fumigated against insect for a cycle of fortnight using P-dichlorobenzene and thymol.

TREATMENT OF EXCAVATED OBJECTS AND MUSEUM EXHIBITS[1]

68. About 235 copper coins received from Sanghol excavated site, Ludhiana, Punjab were treated and preserved chemically using suitable chemicals and solvents.

69. About 30 iron objects (pl. LXXXVUI) received from Jakhera excavation project, Aligarh Muslim University, Aligarh (U.P.) and Kalasur Excavation site were treated and preserved.

70. About 65 copper objects received from different sources were treated and preserved.

71. About 315 pages of an old deteriorated *Quran* were separated from each other using suitable conservation measures. After separation each page has been fumigated against insect and finally encapsulated and preserved.

72. Three wooden bracket figures, two wooden heads, one wooden elephant and one decorated brass flower vase received from Mattanchery Palace, Cochin, were treated, restored and preserved.

[1]Chemical treatment carried out by 69-73 Chemistry Branch of the Survey, 73-75,. Department of Archaeology, Government of Gujarat; and 76-79, National Research Laboratory for Conservation of Cultural Property, Lucknow.

73. The silo, furnace and mud brick structures exposed in the course of excavation of Bibia's mound at Kuntasi in taluka Maliya, were taken up for chemical treatment. To begin with, loose soil was removed by smooth brush. Thereafter, the structures were given coating of solution 2% to 3% fevicol + water. Thereafter, 5% polyvinyl acetate in toluene (sulphur free) solution coating was applied on the structures. Finally, the structures were covered with plastic to preserve from rain and weathering.

74. Twenty-two sandstone sculptures fixed on the pedestal at Kaleshwari, in village Lavanai Lunavada taluga which were badly affected by micro organisms and algae due to their being kept in the open were taken up for chemical treatment and preservation. After removal of dirt and dust with dry coir brush, solution of 3% liquor ammonia, teepol and water was applied and allowed to remain for ten minutes on the sculptures. Thereafter, these were washed thoroughly with water and paper pulp method was used to remove soluble salts and again washed. After completely drying the surface of the sculptures, 3% polyvinyl acetate in toluene was applied as a preservative coating.

75. The three entrance doorways, eleven pillars, sculptures on the western side wall, *narathara, kirti-mukha,* etc., of Tametar temple, Tametar, Gujarat were given treatment with 4% polyvinyl acetate solution in toluene.

76. Sculpture at Shanti Niketan was conserved.

77. Illustrative manuscript *on Kriskna-lila* and a cloth painting Nathdwara Pichhwai in the State Museum, Lucknow was conserved.

78. Eight miniature paintings in Bharat Kala Bhavan, Varanasi was taken up for treatment and conserved.

79. Sixty eight coins and two sculptures from different museums were chemically treated.

RESEARCH AND ANALYSIS [1]

80. Am POLLUTION STUDY IN RELATION TO AGRA MONUMENTS.—The air monitoring laboratory at Agra has been monitoring the level of sulphur dioxide, dust fall, suspended particulate matter and other meteorological parameters in order to study the sulphation rate and effects of various gaseous pollutants and particulate matter on the monuments of Agra. This constant, close and careful watch on the state of soundness of stone and other building material is being kept to protect the monuments of Agra region from the pollution threat by adopting protective measures on the basis of studies done.

Monitoring of sulphur dioxide gas was carried out at Taj Mahal and Sikandara, Agra, on an hourly pattern with automatic sulphur dioxide analyzer. Average concentration at Taj Mahal was measured 9.00ug/m^3 for the period April-December 89 while in Sikandara it was measured 21.00 ug/^{3}.

[1] information from the Director (Science) of the Survey except items 81 and 82, which are from Department of Archaeology, Government of Gujarat and the National Research Laboratory for Conservation of Cultural Property, Lucknow respectively.

Dust (containing sand particles) being abrasive to stone and having catalytic action for the conversion of SO2—SO3—H2 SO4, has been measured quantitatively in order to assess the quality and quantum of hazards. In order to ascertain the probable damage with dust and its qualitative constituents, the dust was examined analytically and it was found laden with appreciable amount of acidic soluble salts and volatile carbon. The dust fall rate was found maximum in Sikandara, lower in Red Fort and least in the Taj Mahal.

The measurement of suspended particulate matter (SPM) was also carried out at Taj Mahal as it is responsible for blackening of the surface. On analysis, appreciable amount of deleterEous salts and carbon black were found to be present Sulphation rate measurement was also carried out besides rain water analysis and measurement of wind parameters.

81. EXCAVATED REMAINS, KUNTASI, DISTRICT RAJKOT.— The Gujarat State Department of Archaeology undertook experiment on different types of material. Application of a mixed solution of 0.5% Aldrin + 5% pentachlorophenol + kerosene oil was found to be effective against termites infecting wooden objects. For control of termites affecting wood used in buildings, a solution of 6% to 7% aqueous sodium pentachlorophenolate + 1% borax mixed in water was used. For removal of old varnish from oil paintings on wooden base solution of diacetone alcohol + two ethoxy ethanol (1:1) was applied.

82. STUDIES ON BLUE TILES FROM CHANDERI, MADHYA PRADESH.— Some pieces of blue tiles from Chanderi monuments were analyzed by Emission Spectroscope and Atomic Absorption Spectroscope to study the colour composition of the tiles.

83. STUDIES ON THE METHODS OF PRESERVATION OF PALM-LEAF. — Study of morphology of palm-leaf and application of consolidants and its effect on palm-leaf was done.

84. CHEMICAL ANALYSIS OF CONSTITUTION OF INDIA.— In order to preserve the Constitution of India, some of the paper samples from different area of the document were analyzed for its conservation. Analysis of acidity and alkalinity, fixing materials in paper were done. Identification of fibres and its composition was also made.

85. STUDIES ON BIODETERIORATION OF AJANTA PAINTINGS.— Biocides were tested *in vitro* and *in situ* on replicas against isolated fungi. Effect of temperature, pH and pigment on the growth of microbes was observed.

86. ERADICATION OF PLANTS GROWING ON MONUMENTS.— To develop suitable methods for the eradication of plants growing on monuments, survey of plants growing on Residency, Lucknow, has been done.

87. STUDY OF EFFICACY OF NATURAL PLANT PRODUCTS AGAINST MUSEUM INSECTS.— Extracts of' custard apple seed, Pangaminea and *neem* seeds were tested to control carpet beatle silver fish on wooden and paper material respectively.

88. STUDIES ON THE EFFICACY OF CONSOLIDANTS FOR STONE.— Studies on the efficacy of silane for consolidation of sandstone were carried out. Water absorption studies before and after treatment were completed.

89. STUDIES ON THE EFFECT OF BIOGENIC ACIDS.—Six biogenic acids were used on 4 different types of stone to study their effect on morphology and roughness of the stone.

90. DEVELOPMENT OF SUITABLE GAP-FILLING MATERIALS.— Studies were carried out on the properties of Del based lime for preparation of various combination of lime plasters.

91. INVESTIGATION ON CLEANING OF BRONZE IMAGES.— Simulated testing was done on green basic carbonate using a number of poly-phosphates, Sodium tripolyphosphate has been found absolutely safe.

92. STUDY ON THE CONSERVATION OF BRONZES IN INDIA.— Survey of condition of bronzes with the collaboration of various museums in Bihar was taken up.

XH ARCHAEOLOGICAL GARDENS[1]

ANDHRA PRADESH

1. HILL-TOP ISLAND GARDEN, NAGARJUNAKONDA, DISTRICT GUNTUR.— The garden was main tained in a satisfactory condition. Arrangements were made to install a submersible pumpset for augmentation of water supply to intensify further development activities.

2. RAMAPPA TEMPLE, PALAMPET, DISTRICT WARANGAL.—Land-scaping work was initiated and installation of pumpset and laying out of pipe line was completed after attending to jungle clearance.

DELHI

3. MAQBARA PARK ON G.T. KARNAL ROAD, DELHI.— Development of the garden was undertaken by well-laid out lawns and plantation of shurbs and seasonal variety of flowers.

4. HUMAYUN'S TOMB NURSERY, NEW DELHI;— Sprinkler system of irrigation was introduced.

5. VIJAY MANDAL, NEW DELHI.— Several kinds of ornamental plants were planted at appropriate places, and pipe was laid out for irrigation.

GUJARAT

6. GROUP OF MONUMENTS AT KALESHVARI, TALUK LUNAWADA, DISTRICT PANCHMAHALS. — The garden was beautified by the plantation of *Delunix regia (gulmohar), Eugenia jambolana (jamun), Azadirachta gunkida (Limdoneem tree), Narium oleander, Polyalthia Langifolia(Asopalav)* of grass.

7. JAMI MASJID, CHAMPANER, DISTRICT PANCHMAHALS.— A deep bore well was excavated for regular water supply to the garden.

8. LOTHAL MUSEUM, LOTHAL, DISTRICT AHMEDABAD.—The site is being made attractive after overcoming acute saline condition by scientific applications.

JAMMU AND KASHMIR

9. MONUMENTS AT PARIHASPURA, DISTRICT BARAMULLA.— A new garden was laid out by rosaries, annual and other flower beds were carved out and planted in best suited manner.

10. MONUMENTS AT AVANTDPUR, DISTRICT PULWAMA.—The group of ancient site situated on the bank of the Jhelum on the national highway were landscaped. Our efforts have made archaeological spots more attractive. Arrangements were made to pump water from the river Jhelum.

KARNATAKA

11. AMRUTESVARA TEMPLE, AMRUTAPUR, DISTRICT CHIKMAGALUR. — Landscaping around the

[1]Information from the Horticulture Branch of the Survey, except item 3 and 6, which are from the Department of Archaeology and Museums, National Capital Territory of Delhi and the Department of Archaeology, Government of Gujarat respectively.

Siva temple was completed. The undulated original topography has been retained by giving smooth slope and *Swarna Champaca (Michelia Champaca)* at the entrance, *Ixora Singaporensis* along the approach road to the temple, *Jasmnum belasampac (mogra)* in front of the temple and temple tree of *Krishna Champaca (Plumoria rubra)* have been planted.

12. ASAR MAHAL, BUAPUR, DISTRICT BIJAKJR.— Two bore wells have been sunk and one centrifugal pump set has been installed in the moat for water supply. Desilting of moat was also taken up in a small area. Laying of pipe line was completed.

13. MONUMENTS AT AIHOLE, DISTRICT BUAPUR.— The construction of ground level water reservoir has been completed and pipe line from the bore well to G.L. S .R. was laid for supply of water to the gardens.

14. JAINA AND KEDARESVARA TEMPLE, HALEBID, DISTRICT HASSAN.—Garden was developed with the plantation of *Nariyal (Coco snucifera),* temple tree (Plumera sp.), *Chandni (Tabernaemontan coronerea), Neem chamele (Malligtonia hortensis), Gurhal (Hibiscus* sp.) *Kaner (Nerium), Gandraj (Gardenis jasmintodes).*

15. DARYA DAULAT BAGH, SRKANGAPATNA, DISTRICT MANDYA.— The garden around Tipu's palace, N.S. temple and Gumbaz was maintained in good condition. To initiate the landscaping around ancient places site, installation of pump set and laying out of pipe line has been completed.

MAHARASHTRA

16. BIBI-KA-MAQBARA, AURANGABAD, DISTRICT AURANGABAD.—Due to scarcity of water, most. of the lawns had dried and were badly infested with weeds. To ease the water supply, submersible pumpset has been installed after sinking new borewell. The eighteen plots were returfed.

17. DAULATABAD FORT, DAULATABAD, DISTRICT AURANGABAD. — After sinking one bore well, installation of submersible pump set and laying out of pipe line was completed. One centrifugal pumpset was also installed on an open well.

18. PATALESVARA CAVE, PUNE, DISTRICT PUNE.— *Gurhal (Hibiscus Rose sinsis), Jasmnum sambac (Mogra),* temple tree (Plumeria sp.) have been planted.

RAJASTHAN

19. KACCHA BAGH, DEEG, BHARATPUR.— Besides lawns and plants this monument has sufficient fruit plants but the irrigation facilities are very restricted! A motor pump set was installed.

20. PADMINI PALACE, CHITTAURGARH, DISTRICT CHITTAURGARH.—More fruit plants were intro duced.

TAMIL NATXJ

21. SHORE TEMPLE, MAHABALIPURAM, DISTRICT CHINGLEPUT.—The area was full of sand and to commence horticultural activities, good earth was spread upto the depth of 20 cm in the entire area. Pits for trees and shrub beds were filled with 1.2 metre good earth. The plantation of *Casurina*

equintifolia has been completed along the north, east and south boundary line to prevent saline winds.

22. BRIHADEVARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR.—For the augmentation of water supply the two borewells were sunk and one pumpset installed. The garden was maintained in good condition.

23. VELLORE FORT, DISTRICT VELLORE.— Landscaping has been taken up to develop the environment and to prevent the misuse of archaeological area. Centrifugal pumpset was installed in the moat and pipeline work was started.

UTTAR PRADESH

24. AGRA FORT, DISTRICT AGRA.—The neglected portion of Meena Bazar in the fort complex was brought under beautification. A tube well was bored to give strength to augment water supply and distribution of pipelines were laid.

25. AKBAR'S TOMB, SIKANDRA, DISTRICT AGRA.— The worn-out and decade old system of irrigation was rejuvenated by introducing modem system of irrigation through sprinkler system.

26. RAM BAGH, DISTRICT AGRA.— A new well pump set was installed to ensure regular water supply to the garden.

27. FORT, DISTRICT JAUNPUR.— The fort at Jaunpur has been brought under landscaping by introducing plants and providing irrigation system.

28. FORT, DISTRICT JHANSI.— A new garden was laid out.

29. SIKANDAR BAGH, DISTRICT LUCKNOW.—Landscaping was introduced in phases. In the first phase, the site was prepared for laying lawns, plants and trees. The work is in progress.

WEST BENGAL

30. KALA CHAND TEMPLE, BISHNUPUR, DISTRICT BANKURA.— The site was landscaped in a befitting manner.

XHL PUBLICATIONS

PUBLICATIONS OF THE SURVEY

1. INDIAN ARCHAEOLOGY—A REVIEW.— The issue for the year 1985-86 was in advanced stage of printing and 1986-87 was sent to press.

2. MEMOIRS OF THE ARCHAEOLOGICAL SURVEY OF INDIA.— The report on *Excavations at Surkotada and explorations in Kutch* by Jagat Pati Joshi as Memoir No. 87 was in final stage of printing.

3. ARCHITECTURAL SURVEY SERIES.— Numbers 4 and 5, *Temples of Pratihara period in Central India* by R D. Trivedi and *Temples of Khajuraho,* in 2 volumes by K. Deva, respectively were in advanced stages of printing.

4. CORPUS INSCRIPTIONUM INDKARUM.— Volume VII, part III was published.

5. EPIGRAPHIA INDICA.— Article index of Vol. I to XXXIV (1888-1962) was published.

6. SOUTH INDIAN INSCRIPTIONS.— Volume XXVI was brought out

7. ANNUAL REPORT FOR INDIAN EPIGRAPHY.—The issue for. the years 1974^75 and 1981-82 are in advanced stage of printing.

8. MISCELLANEOUS PUBLICATIONS.—Folders on Jantar Mantar and Map of Delhi was brought out in English and Hindi.

OTHER PUBLICATIONS

ANDHRA PRADESH.—The Department of Archaeology and Museums, Government of Andhra Pradesh brought out the following publications: *Epigraphia Andhrica,* Vol. V; *Annual Report* for the years 1982-83,1983-84,1984-85 and 1985-86; *Journal of Archaeology* Vol. m, No. 7; *and Select Monuments of Hyderabad* (Reprint).

GUJARAT.—The Department of Archaeology, Government of Gujarat, brought out the following publications during the year under review: *Amadavad aaj ane Kal* (in Gujarati) Hijari san (Gujarati), both by M.H. Raval; *The Saktikunda at Akhaj* in English by P.C Parikh; and Two folders on Tametar (in English and Gujarati) and Umta (Gujarati).

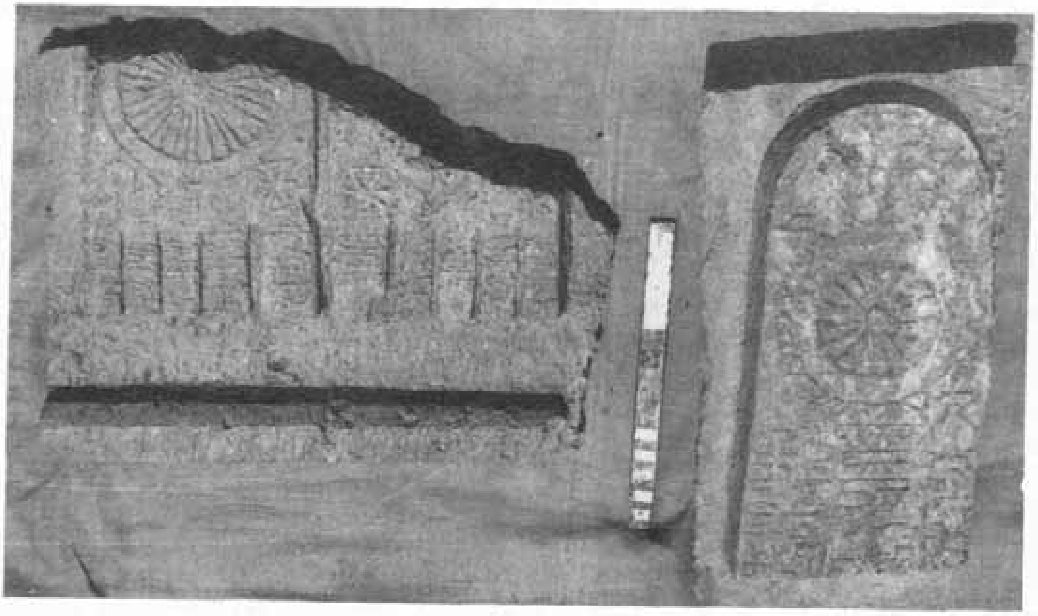


A

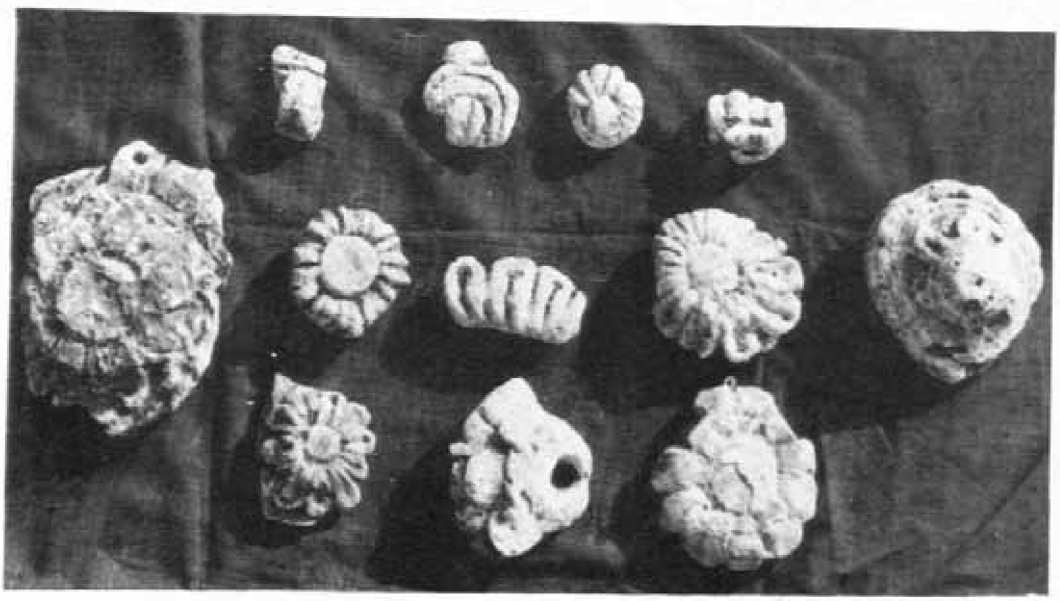


B

Thotlakonda: exposed structures. *See pp. 5-6*



A

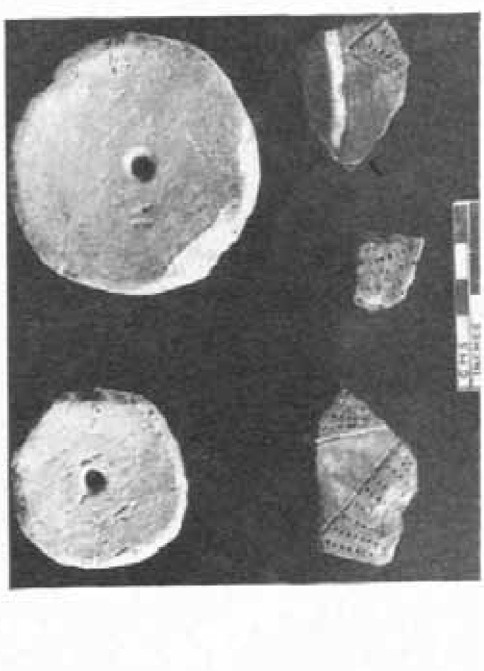


B

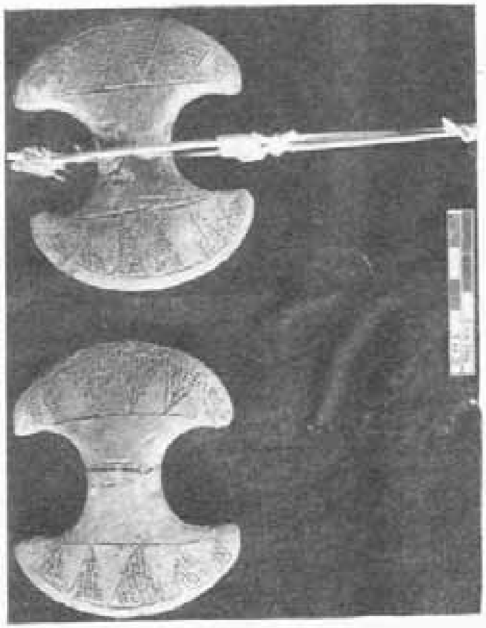
Thotlakonda : A, miniature figures of Muchilinda Naga; B, stucco medallions. See pp. 6-7



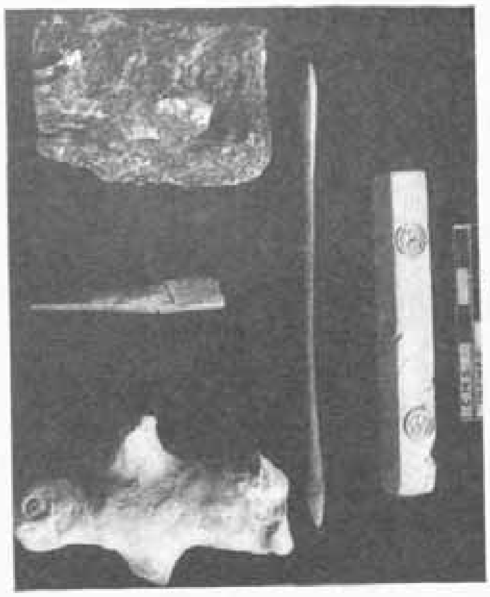
A



B

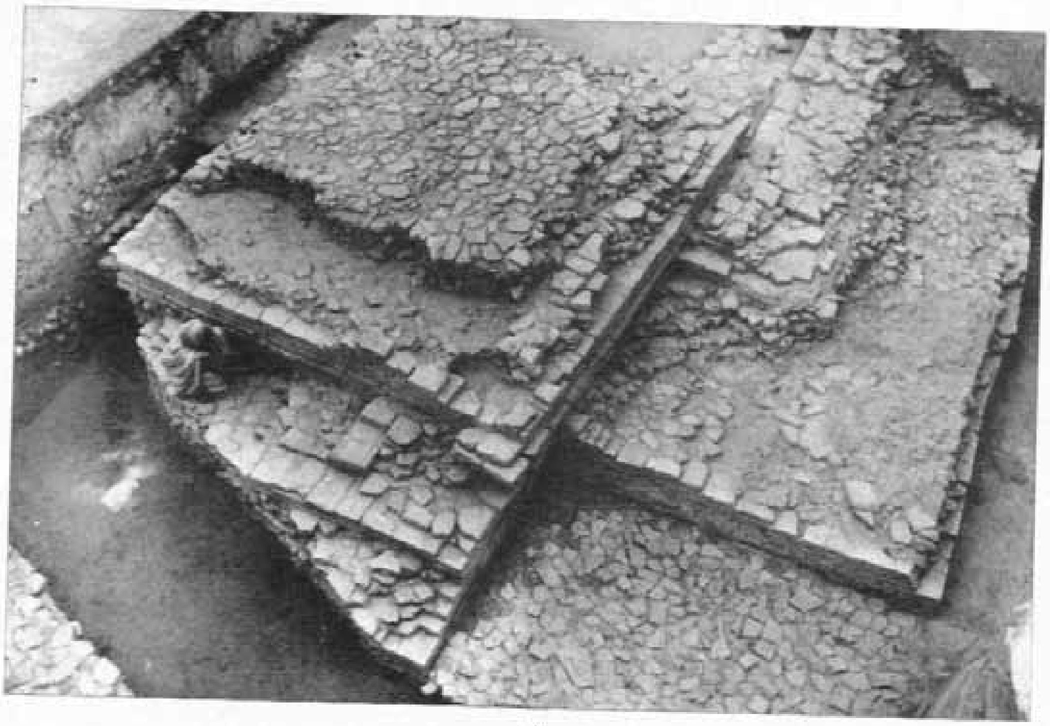


C



D

Maner : A, microlithic tools; B, spindle whorls and potsherds; C, double edged axe; D, terracotta human figurine, antimony rod, bone points, ivory dice and iron object. *See p. 11*



A



B

Kolhua : exposed structures. See p. 12



A

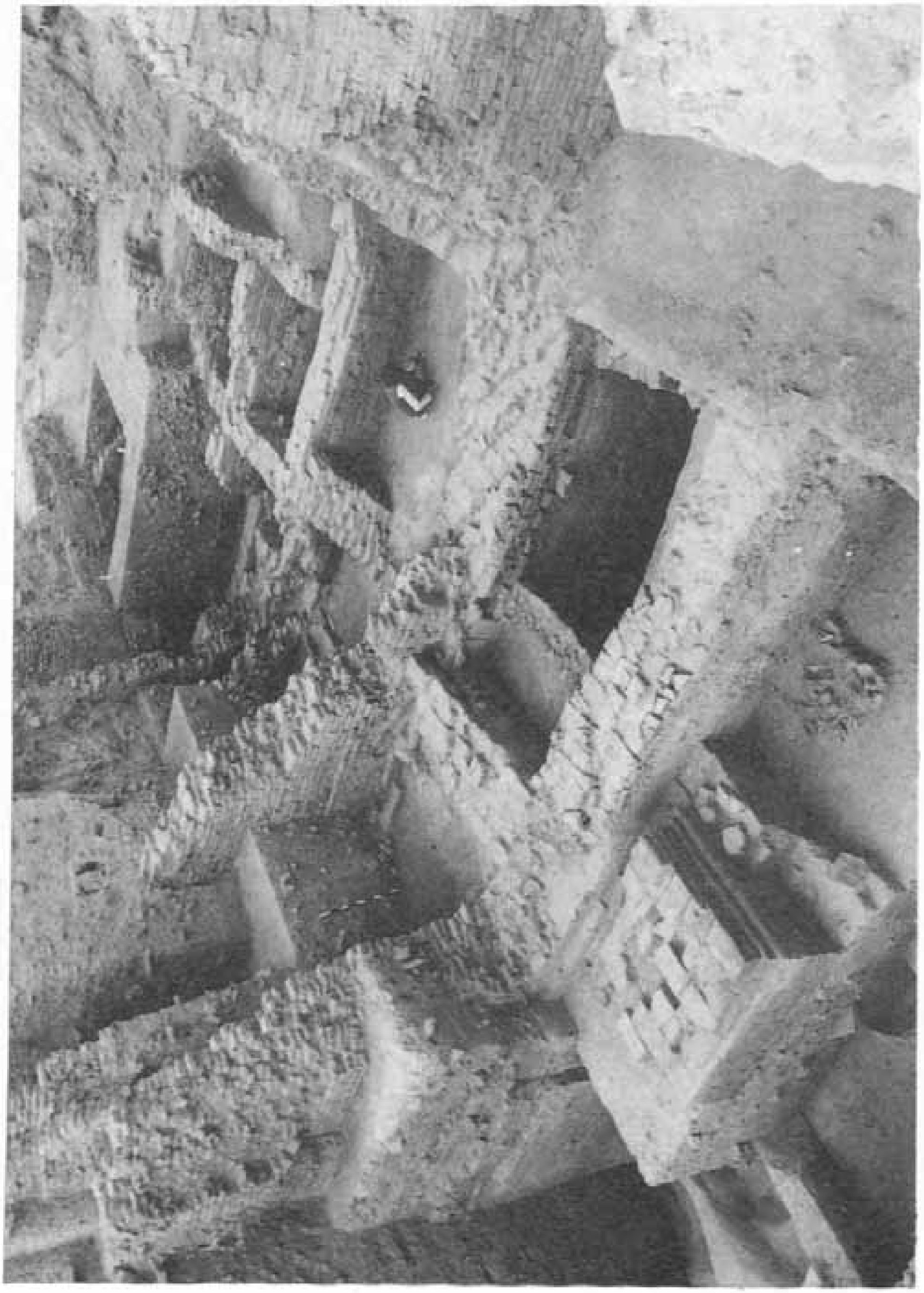


B

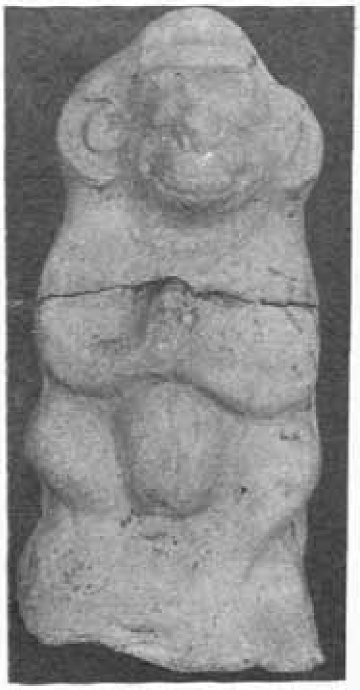


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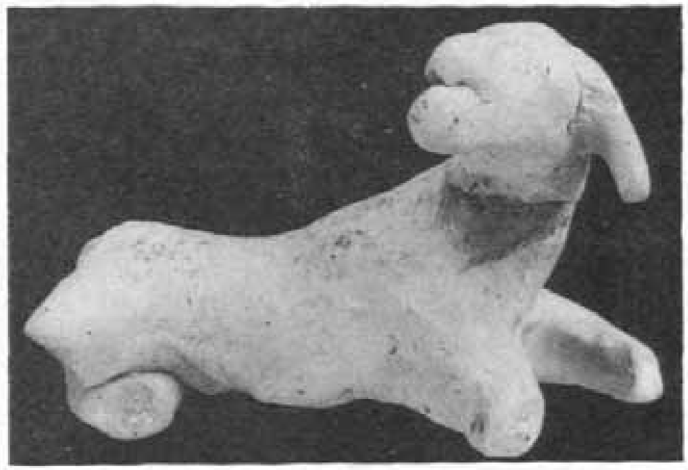
Kolhua : A, exposed monastic establishment; B, terracotta plaques; C, inscribed sherd. See pp. 12-13



Harsh-ka-Tila (Thanesar) : view of excavated structures of different periods in the rain gulley. See p. 28



A



D

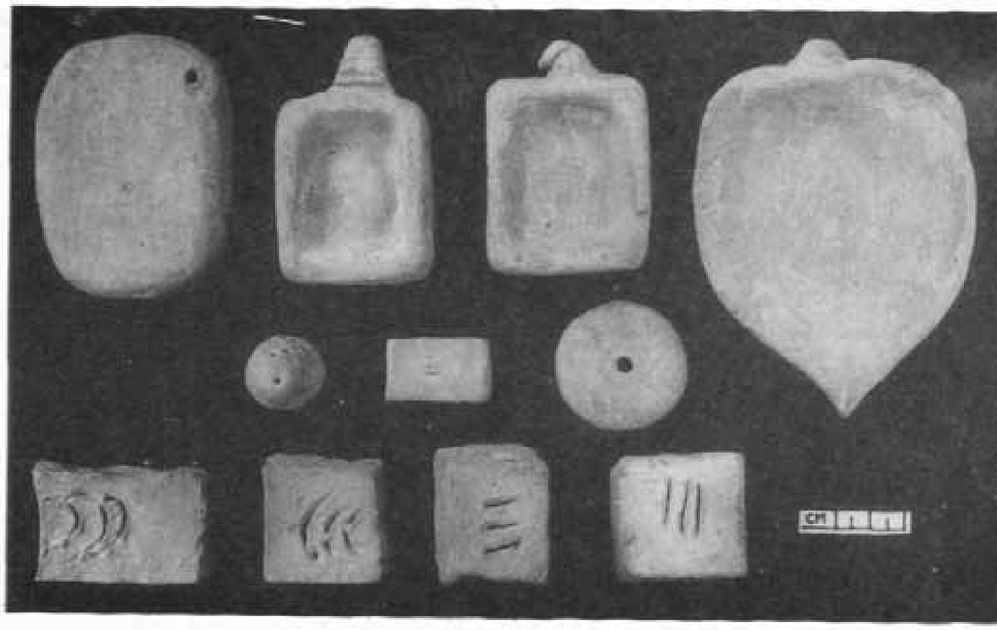


B

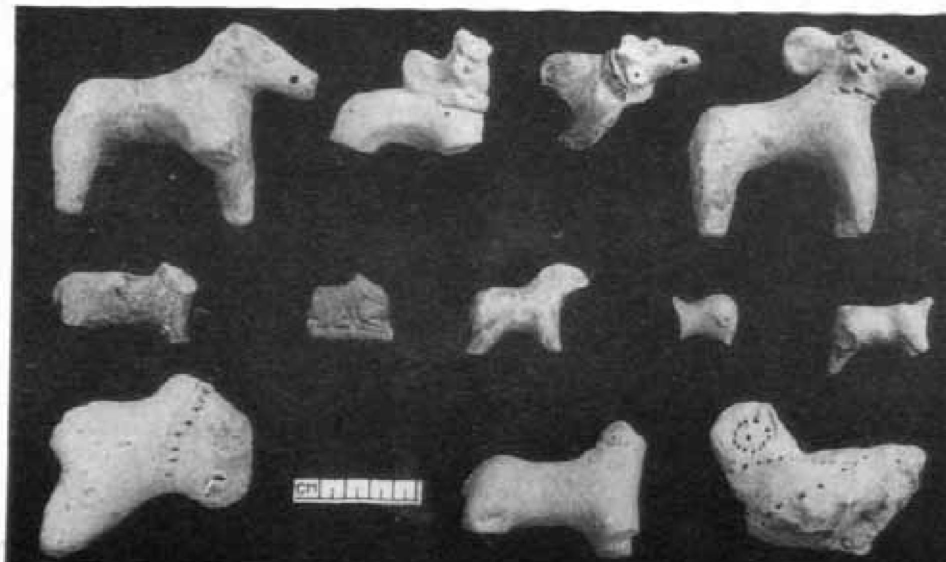


C

Harsh-ka-Tila (Thanesar) : A, Naigamesha; B, female head; C, double moulded leogryph, D, couchant dog. *See pp. 29 and 32*



A

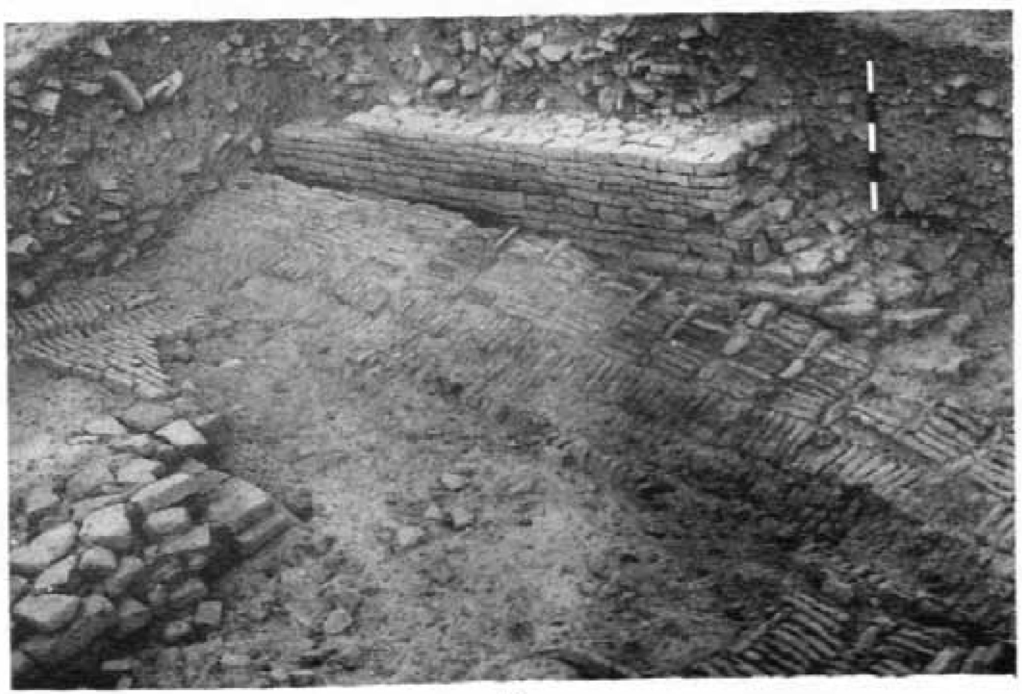


B

Harsh-ka-Tila (Thanesar) : terracotta, A, ritual objects and B, animal figurines. See p. 30

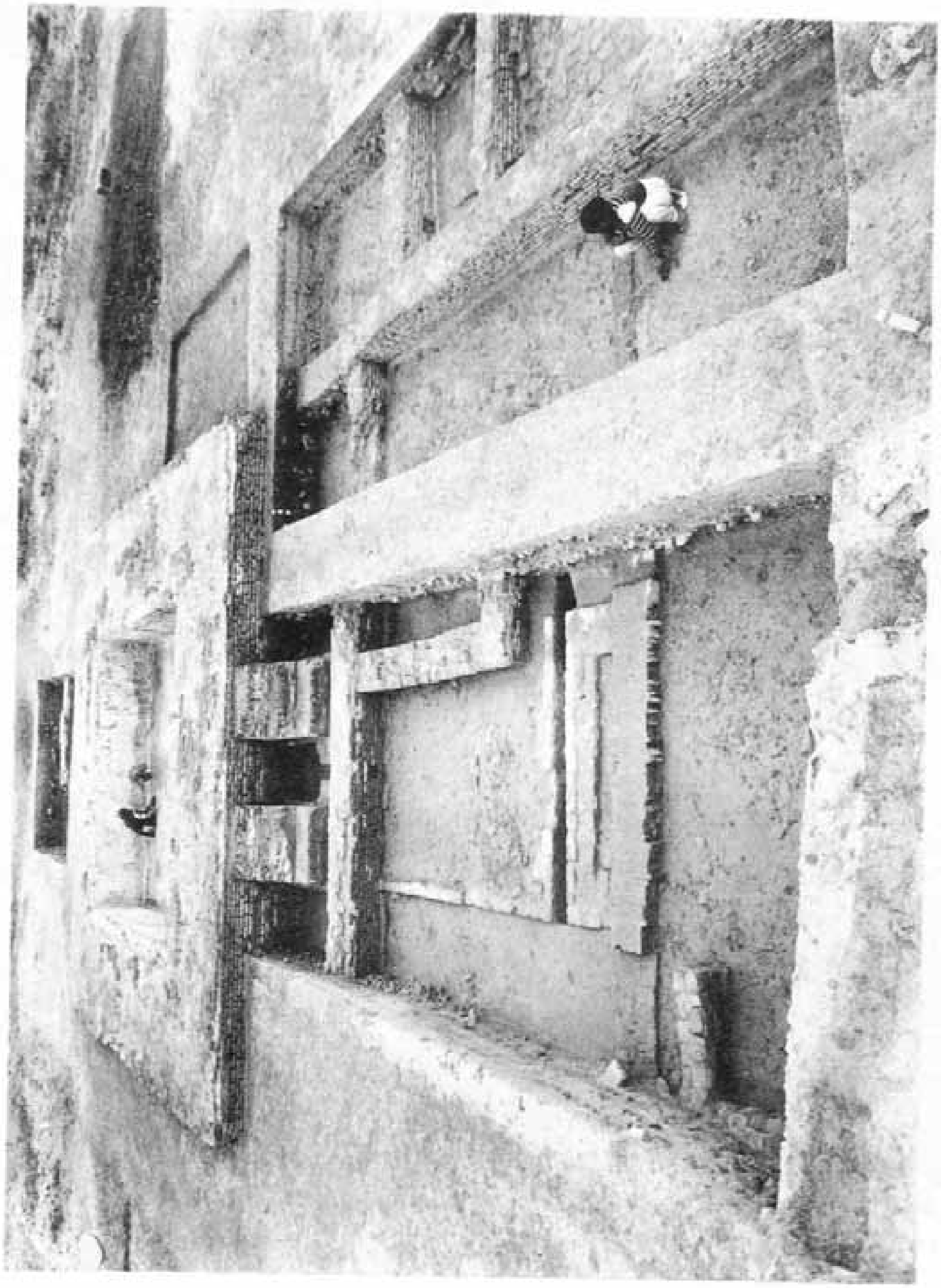


A

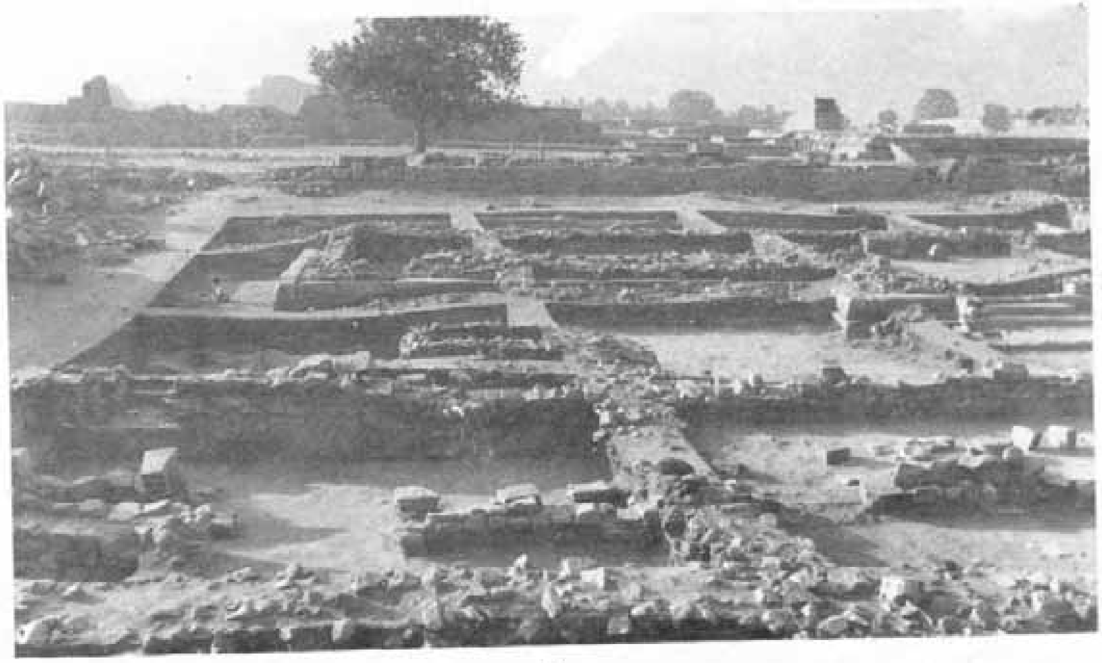


B

Harsh-ka-Tila (Thanesar): A, brick paved house complex and B, drain cum bricks-on-edge pathway, Mughal period. *See p. 31*



Harsh-ka-Tila (Thanesar): garden-complex, Mughal period. See p. 31



A



B

Hampi : A , exposed rubble structures ; B, skeleton of a horse. *See p. 36*

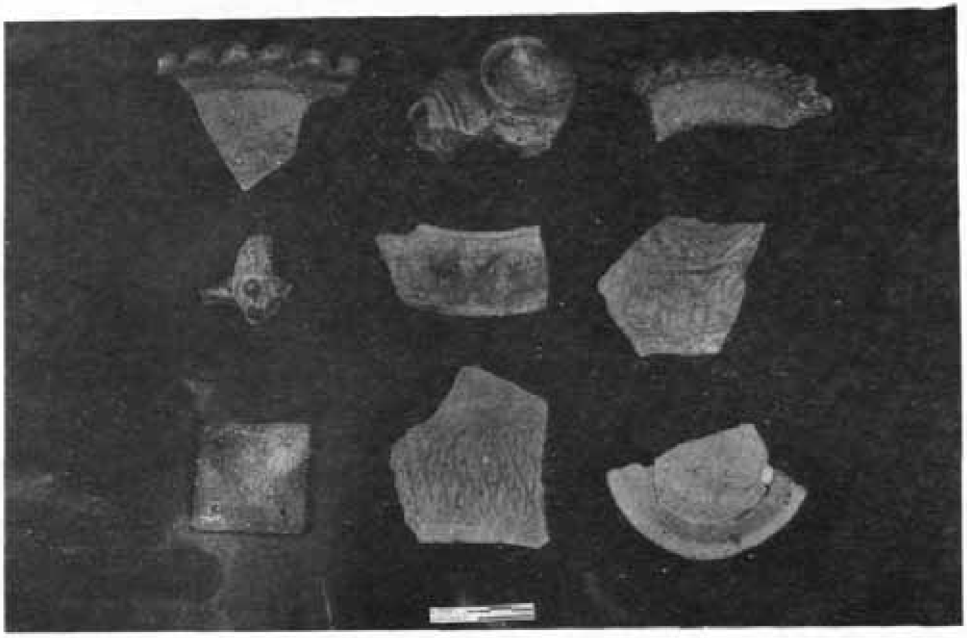


A



B

Gudnapur : exposed structures. See p. 43



A

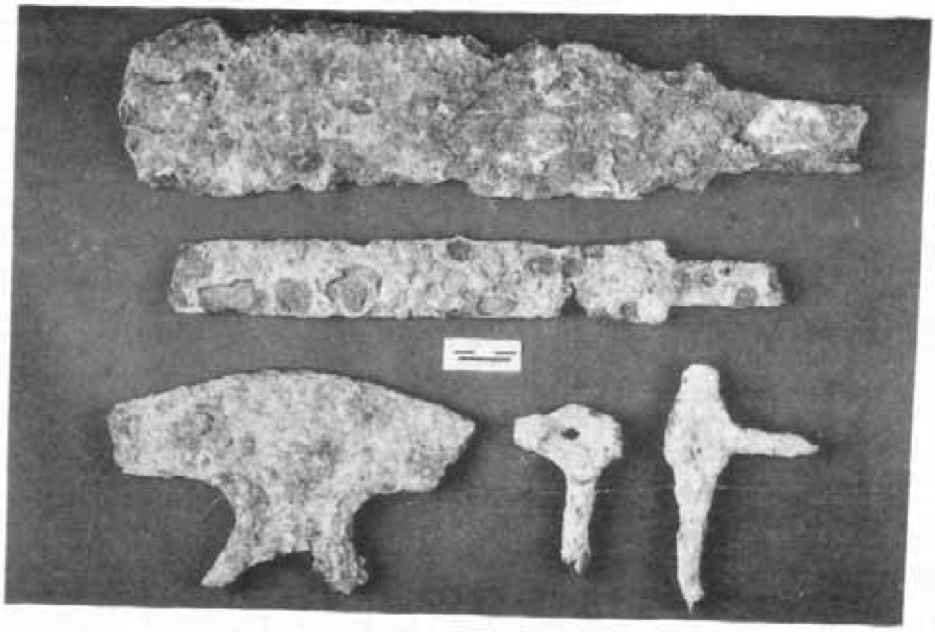


B

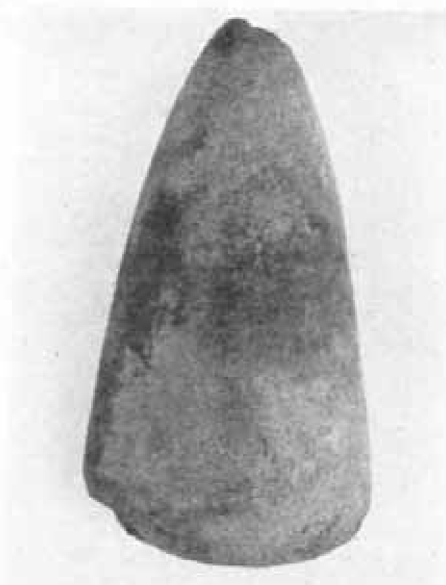


C

Gudnapur : A, decorated potsherds; B and C, metallic objects. See, pp. 44-45

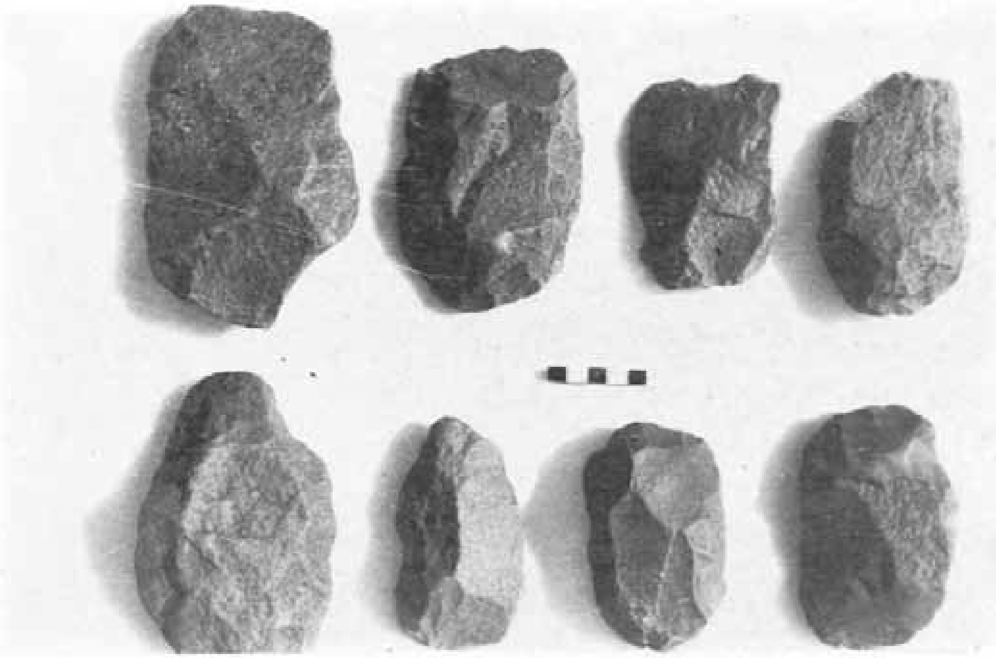


A

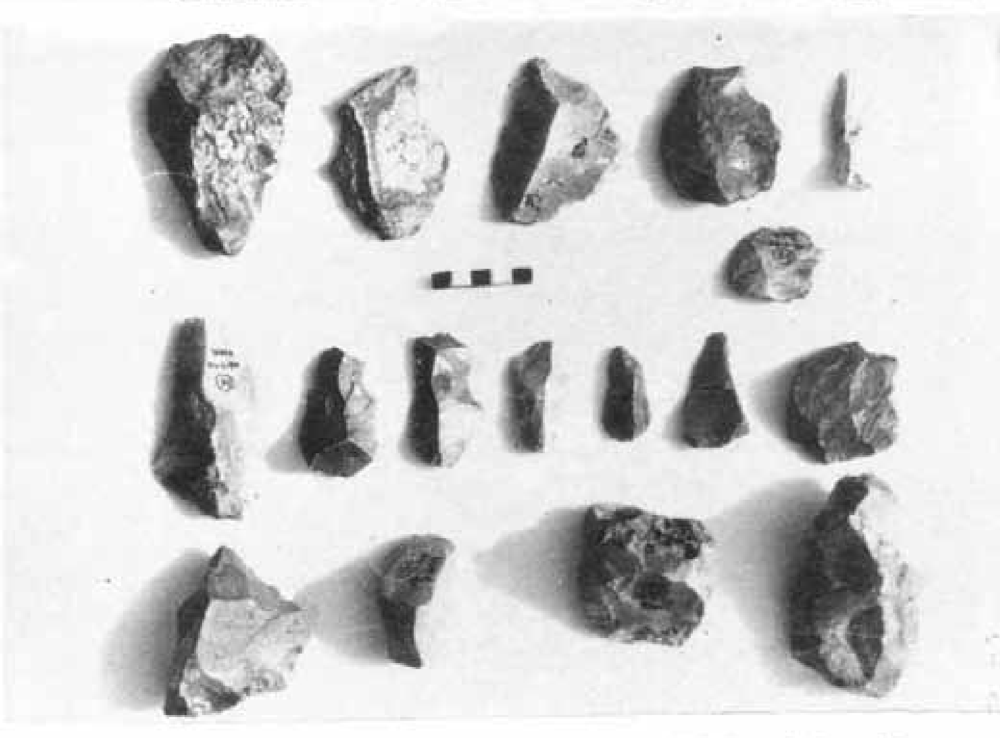


B

A, Valiyapadam : Megalithic iron implements; B, Mantrothuruth : neolithic stone axe. See pp. 45-46

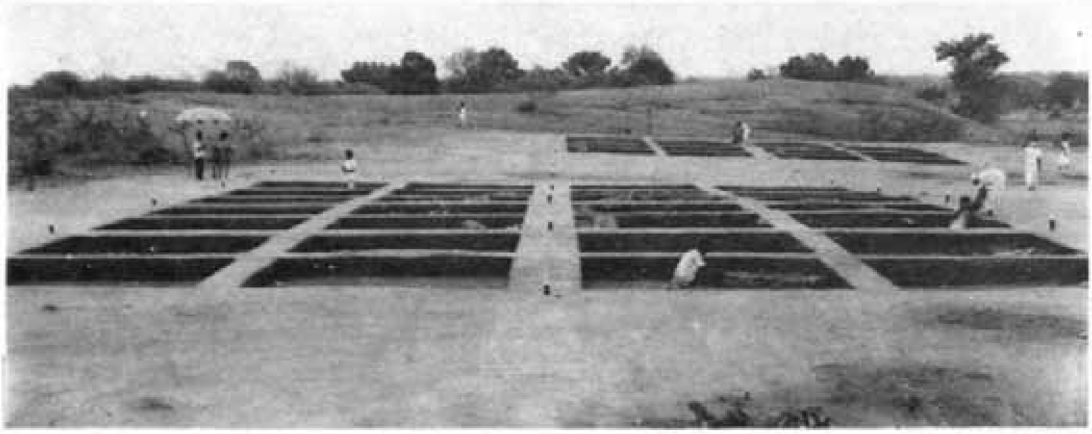


A

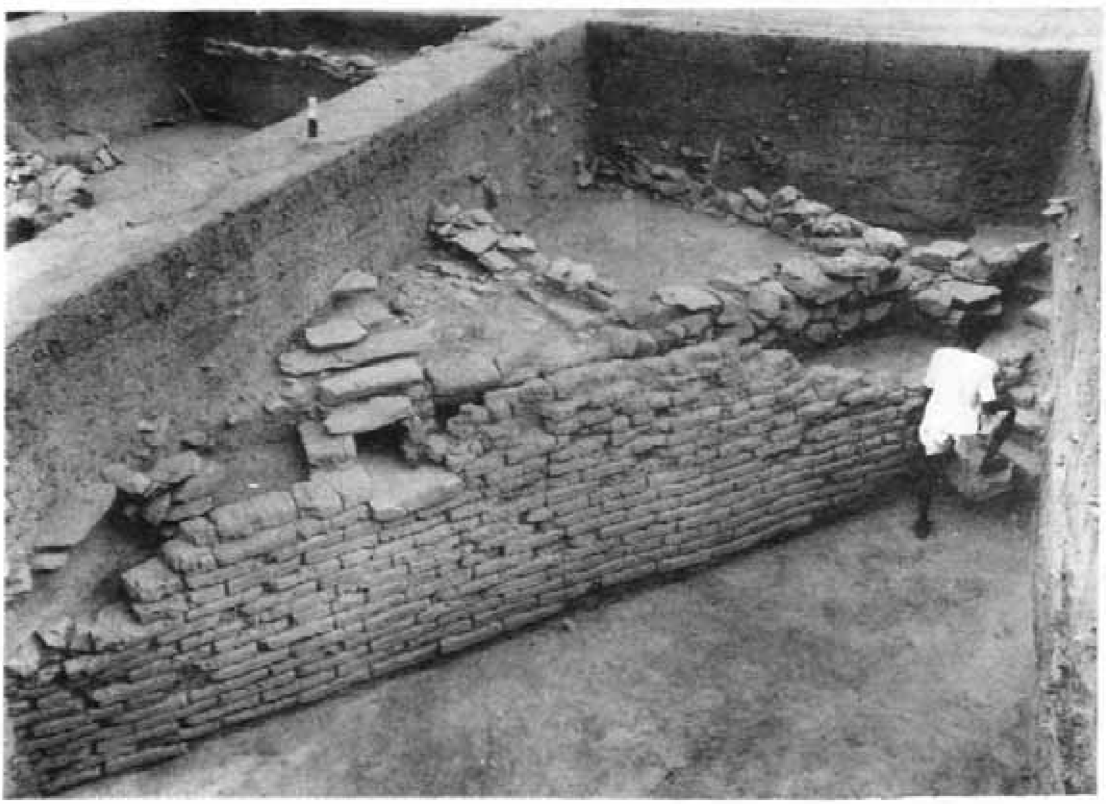


B

Chandarpur and Sagar-Narsinghpur road : palaeolithic tools. See p. 54



A



B

Adam : A, trenches inside the rampart and B, exposed structures, Period IV. See pp. 61 and 64



A

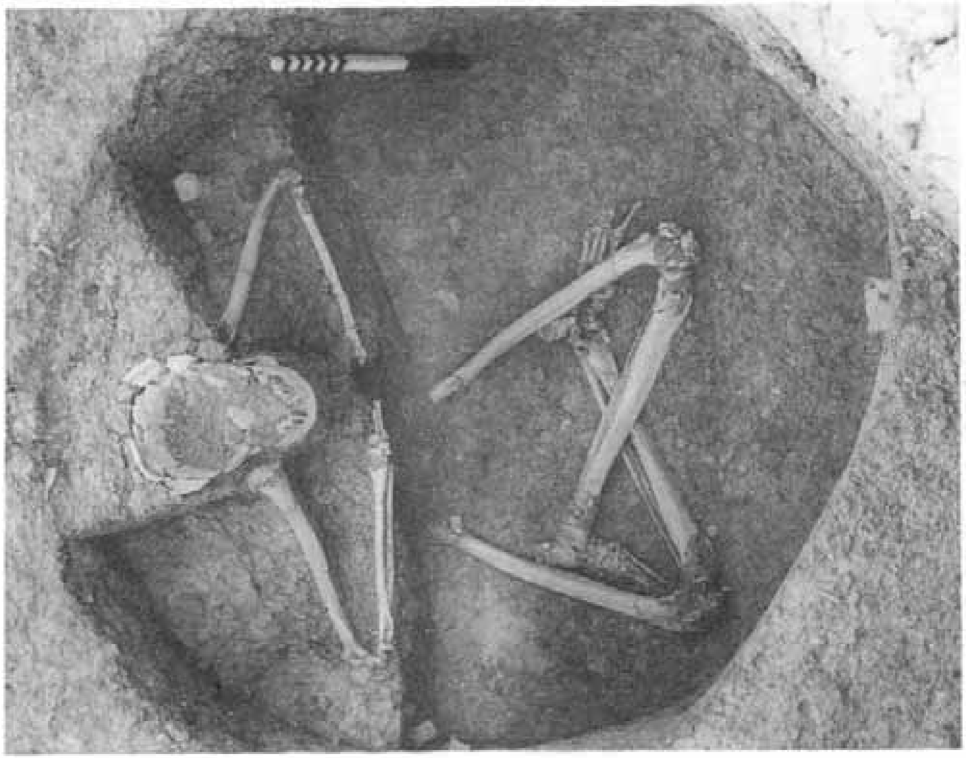


B

Adam : exposed wells, A. Period IV and B, Period V. See p. 64



A



B

Adam : A, ring well and B, exposed burial, Period V. See pp. 64-65



A



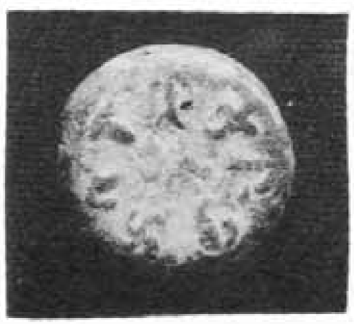
B



C



D

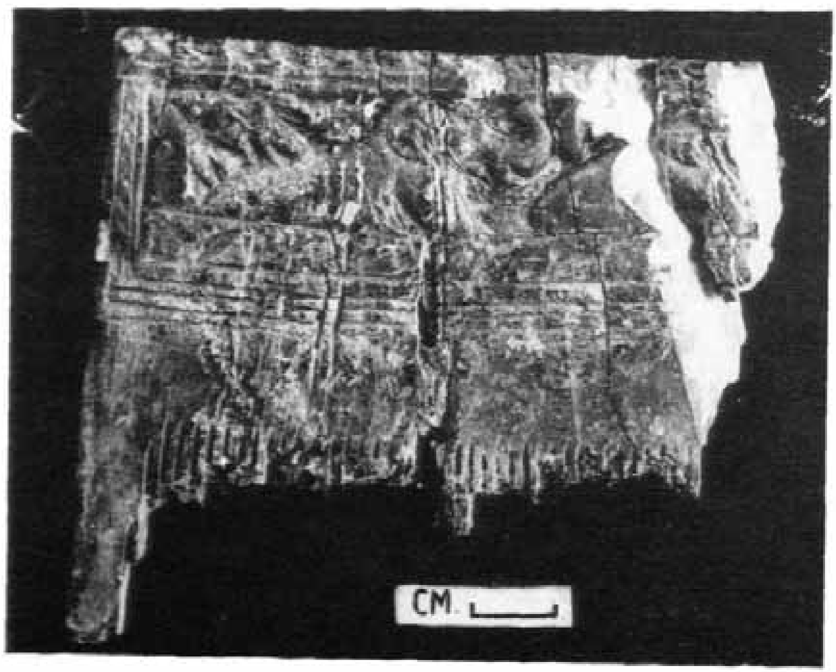


E

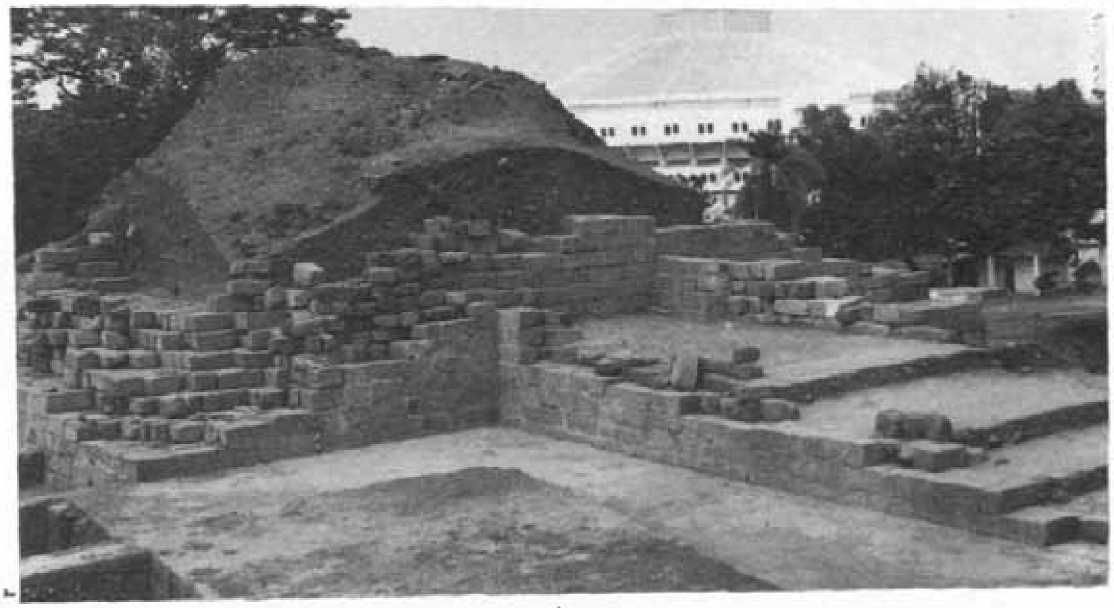
Adam : A-B and E, terracotta sealings; C-D, Coins. See p. 65



A



Adam : broken bone comb. *See p. 65*



A



B

Barabati fort, Cuttack : A, view of structure, approach ramp and lime concrete flooring; B, view showing rows of pillars of laterite blocks. *See p. 76*



A



B



C



D

Lalitagiri : A, B and D, carved architectural members and C, terracotta female figurine. See p. 79



A

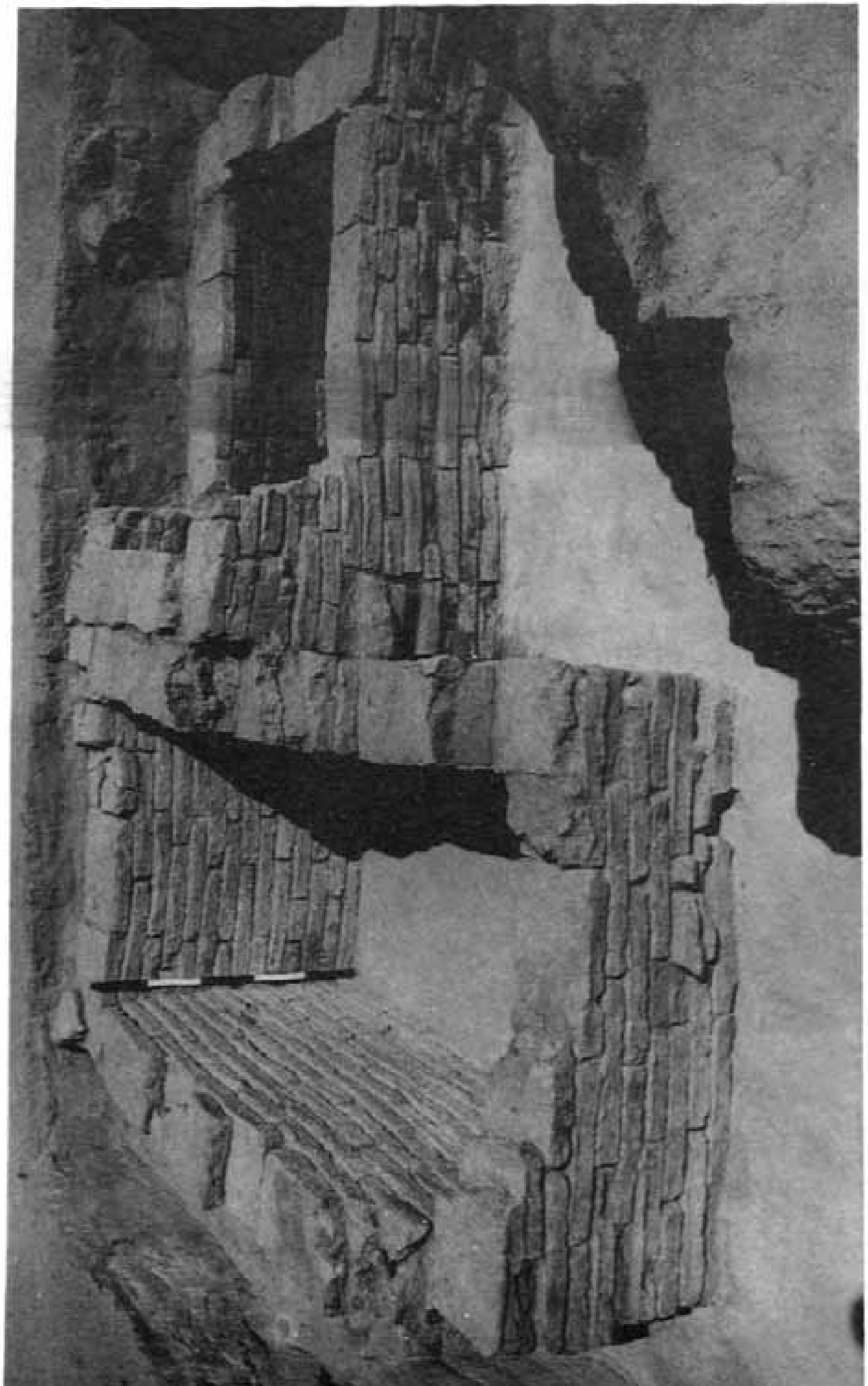


B

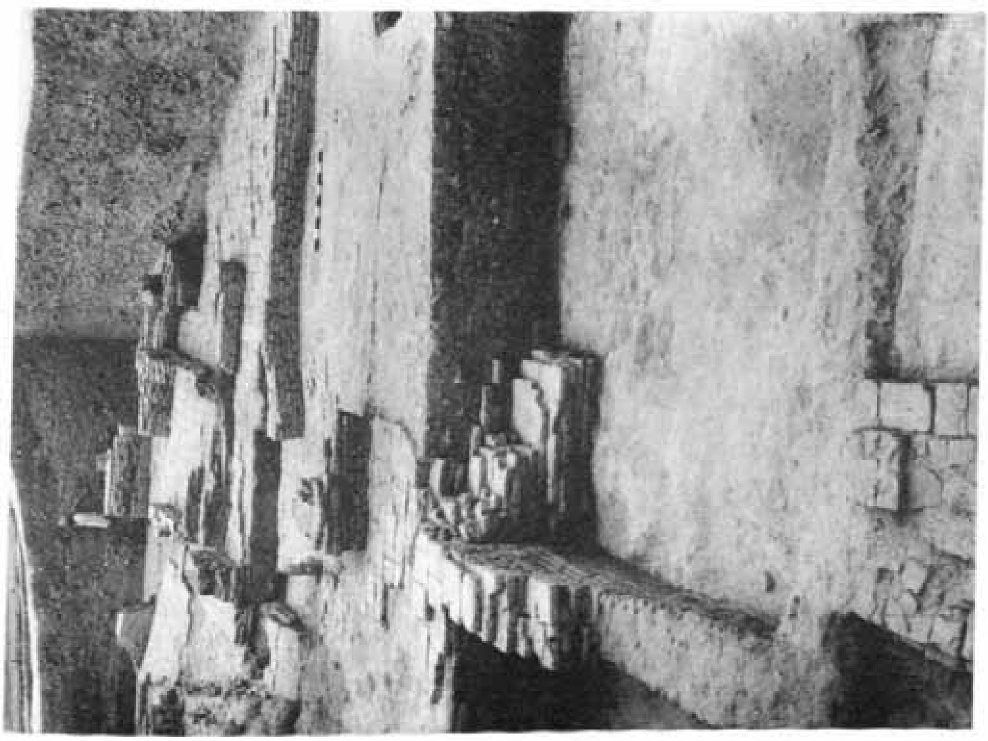


C

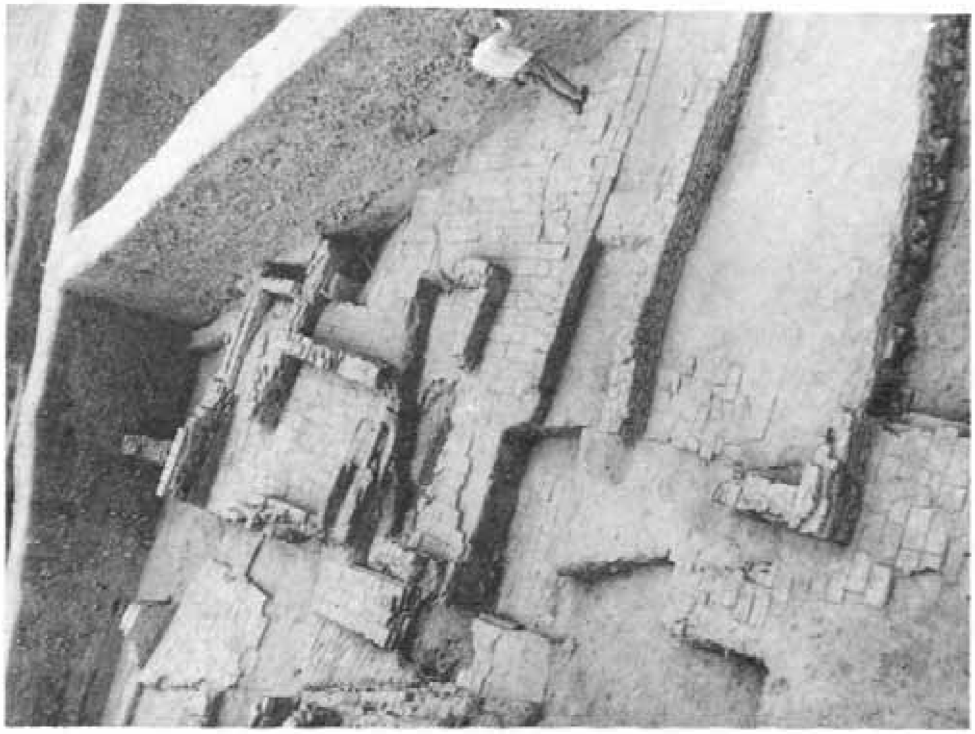
Lalitagiri : A, exposed sculptures; B, stone window grill showing snake with hoods; C, terracotta sealing. See p. 79



Arikamedu : exposed structures. *See p. 86*

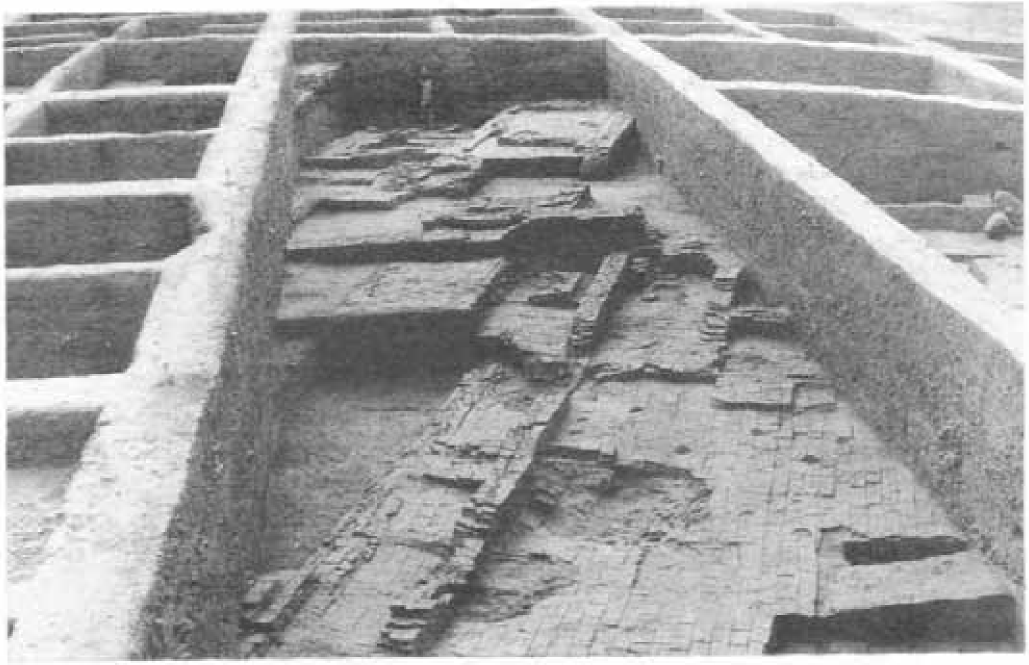


A



B

Sanghol : view of exposed structures, palace complex. See pp. 89-90



A

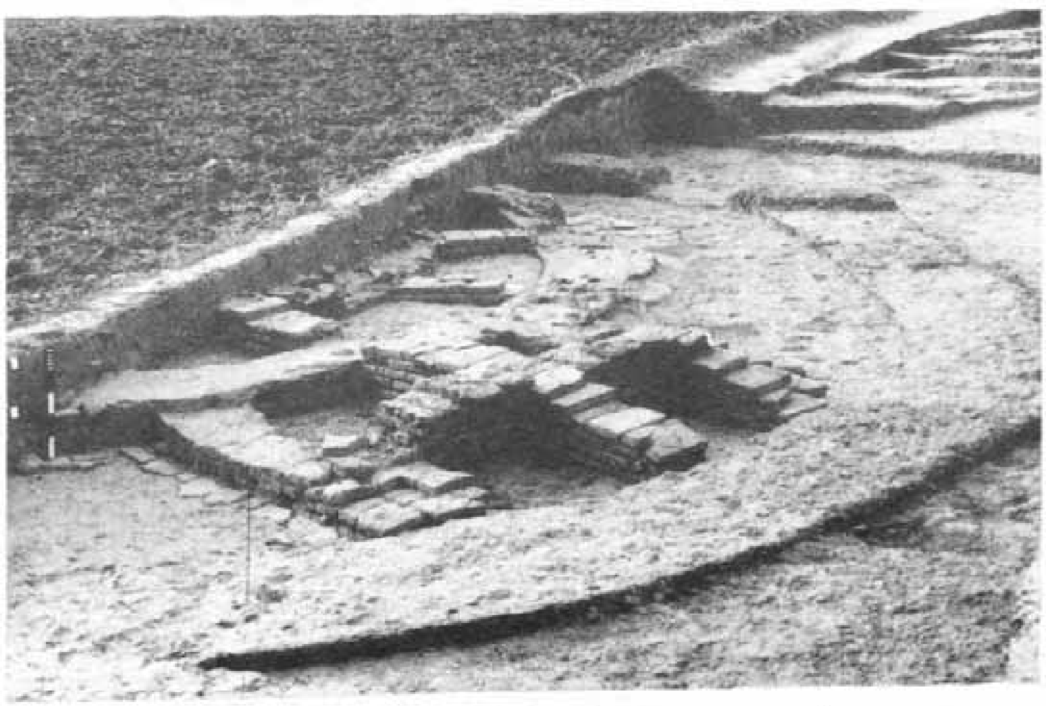


B

Sanghol : A, exposed structures, palace complex; B, structures, religious complex. *See p. 90*

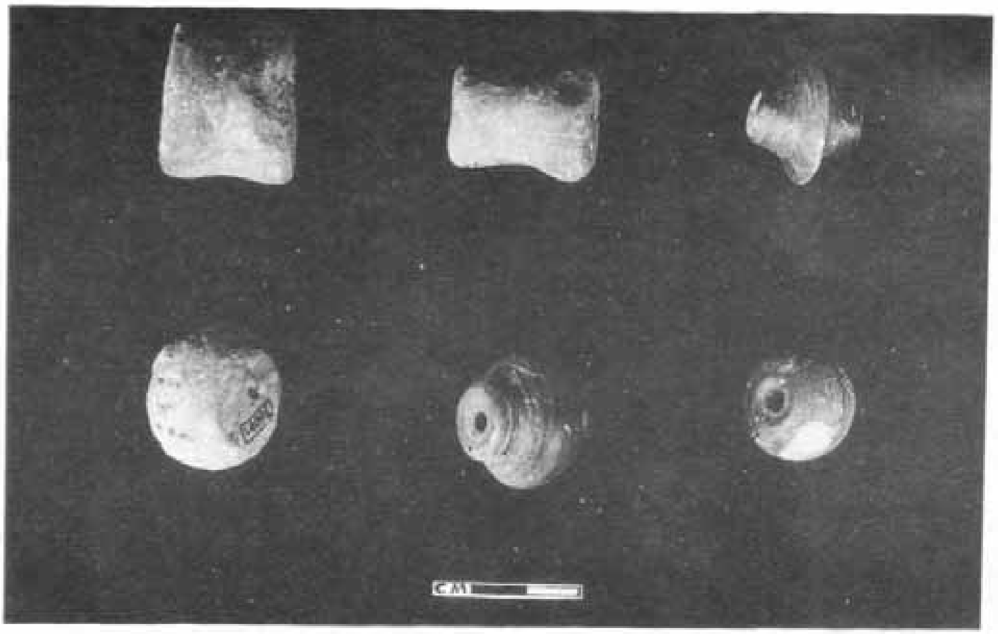


A

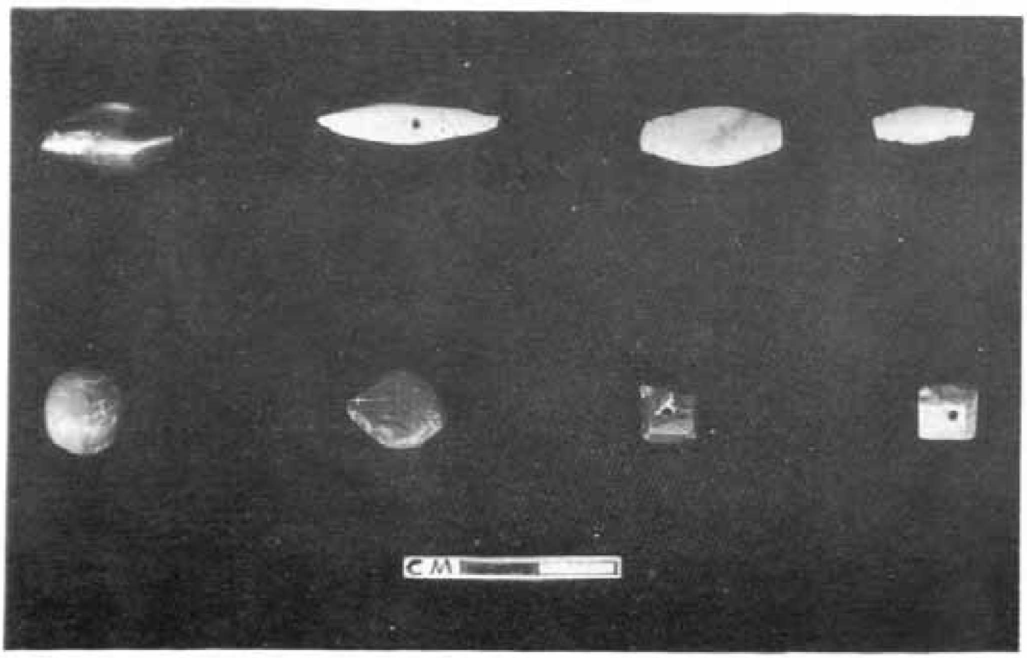


B

Sanghol: A, platform with corner portholes for raising cover or canopy, palace complex; B, part of the excavated stupa. See pp. 90-91



A

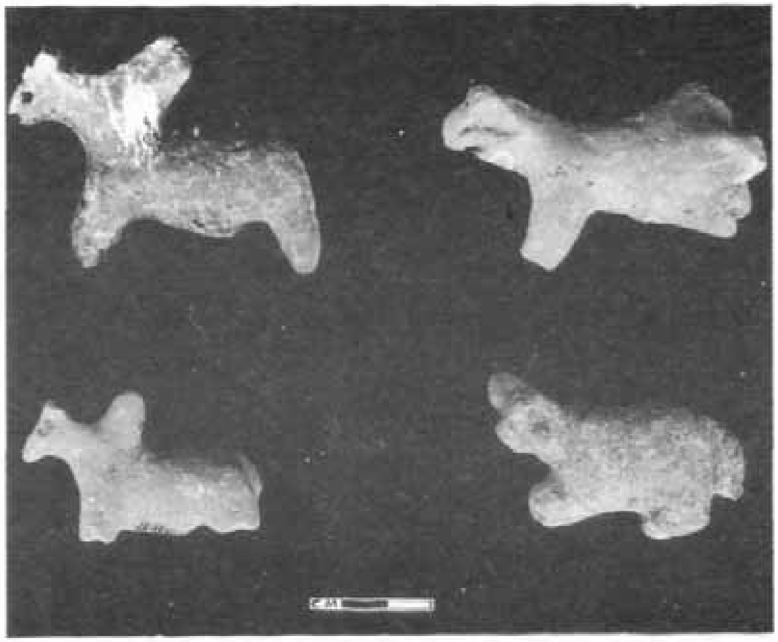


B

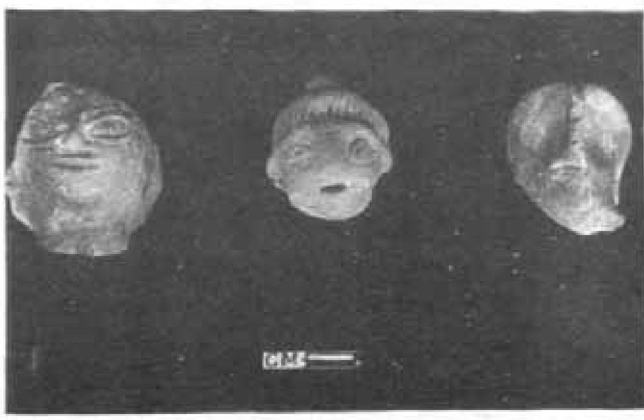
Sanghol : A, ear-studs; B, semiprecious stone beads. See pp. 91-92



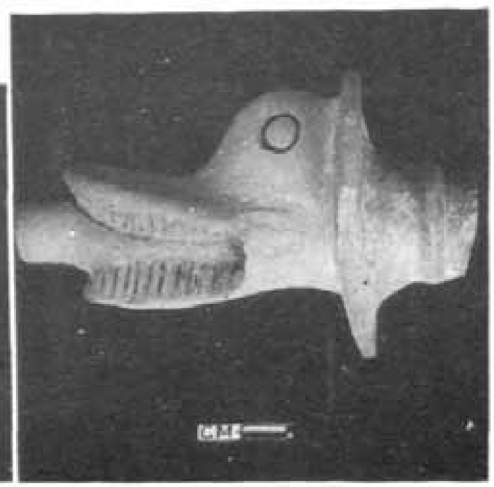
A



C

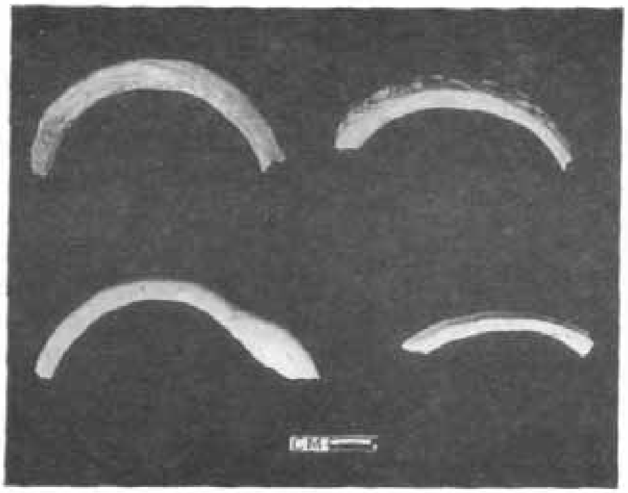


B

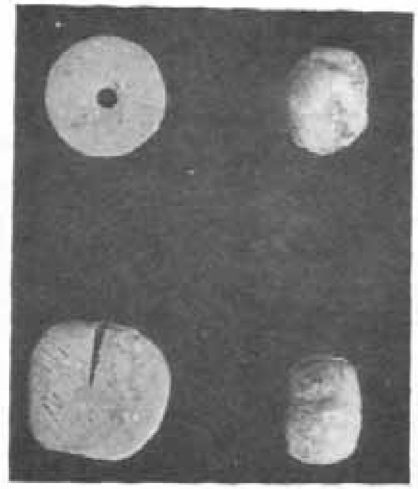


D

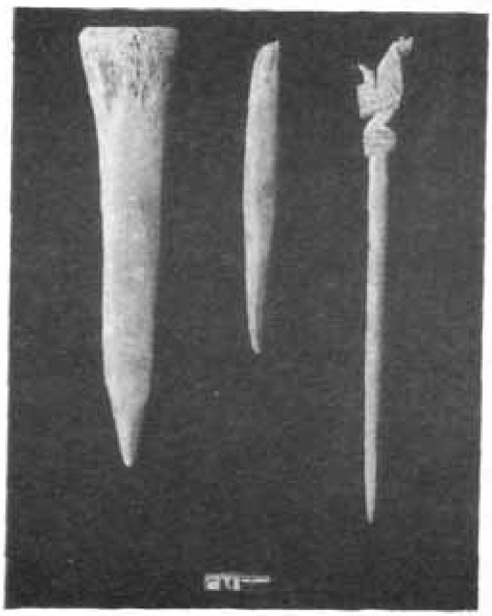
Sanghol: A-B, terracotta human figurines; C, terracotta animal figurines; D, animal headed spout. See p. 91



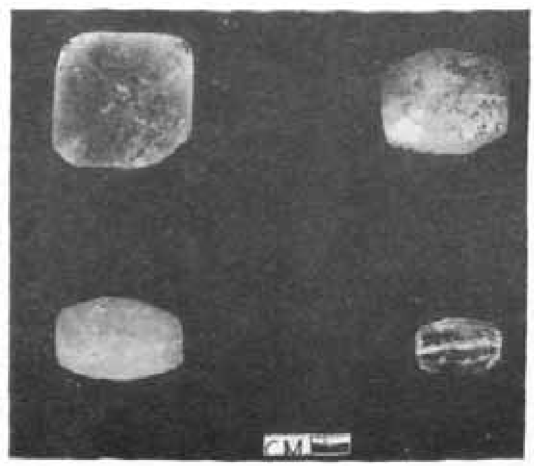
A



D



B



C

Sanghol: A, terracotta bangle pieces; B, bone and ivory objects; C, crystal beads; D, shell beads. *See p. 92*



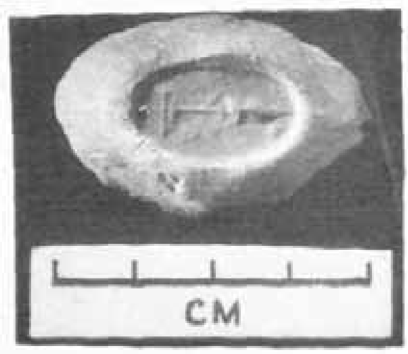
A



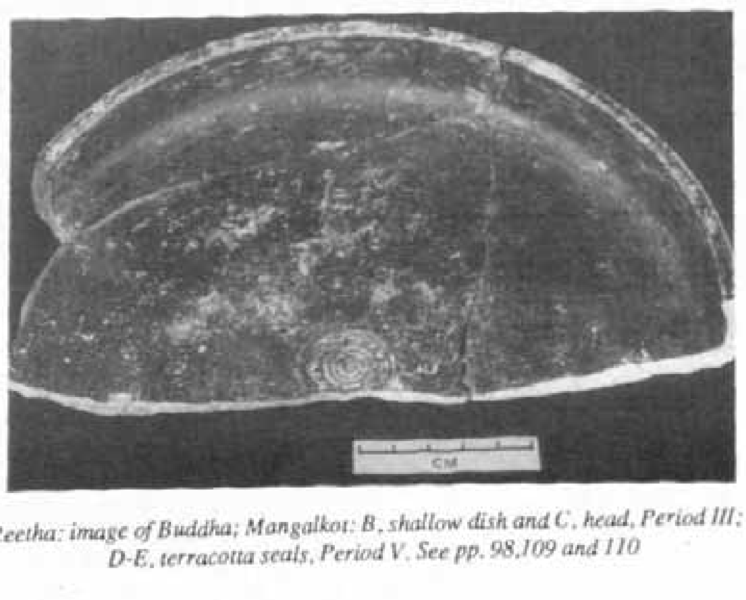
D



C

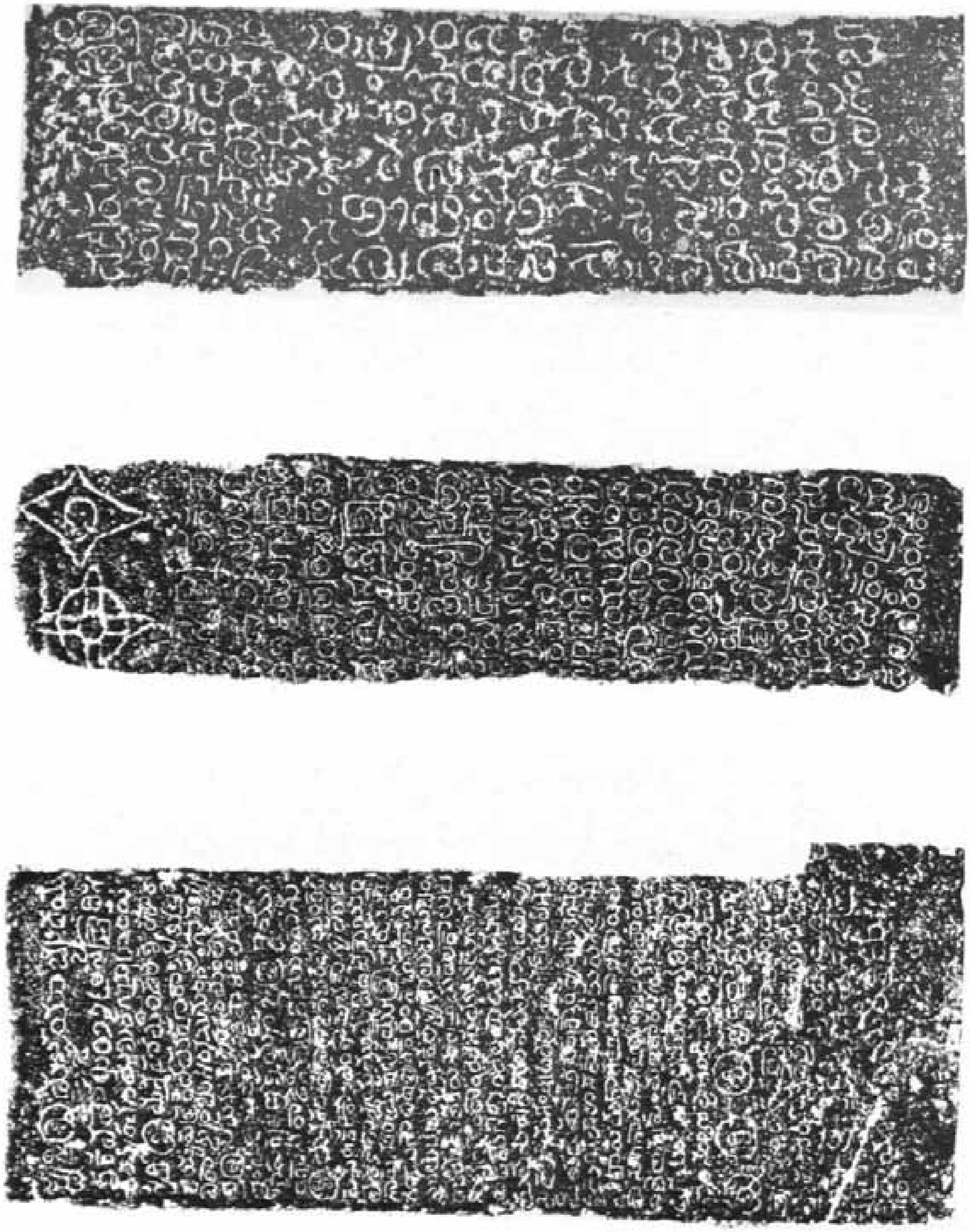


E



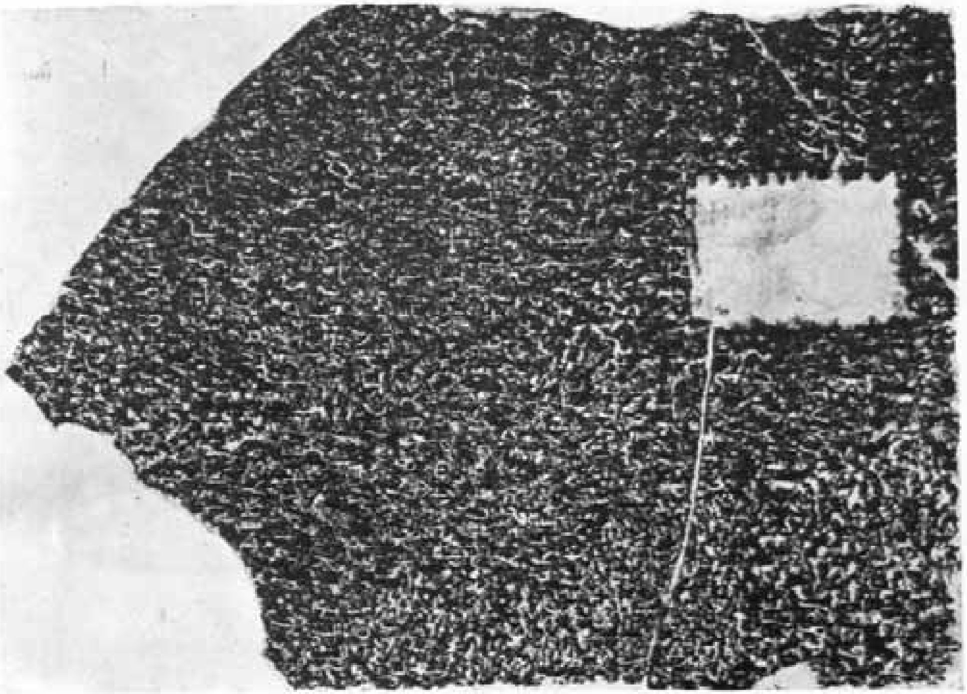
B

A, Reetha: image of Buddha; Mangalkot: B, shallow dish and C, head, Period III; and D-E, terracotta seals, Period V. See pp. 98,109 and 110

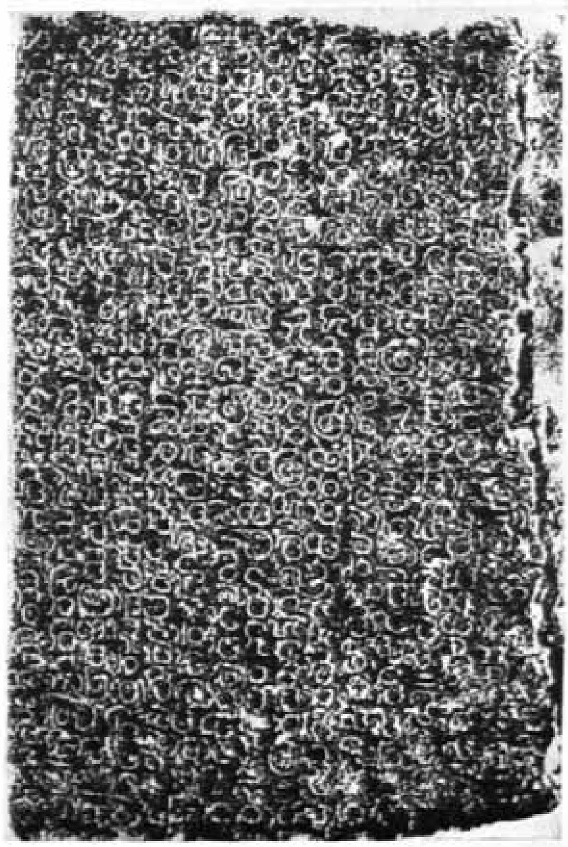


A B C

A, Medavaram : inscription of Kakatiya king Rudradeva; B and C, Palivela : inscription of Prataparudradeva. See p. 112



B



A

A. Markhal : Kalyana Chalukyan inscriptions; B. Sannathi : Asokan edict. See p. 113



A



B



C

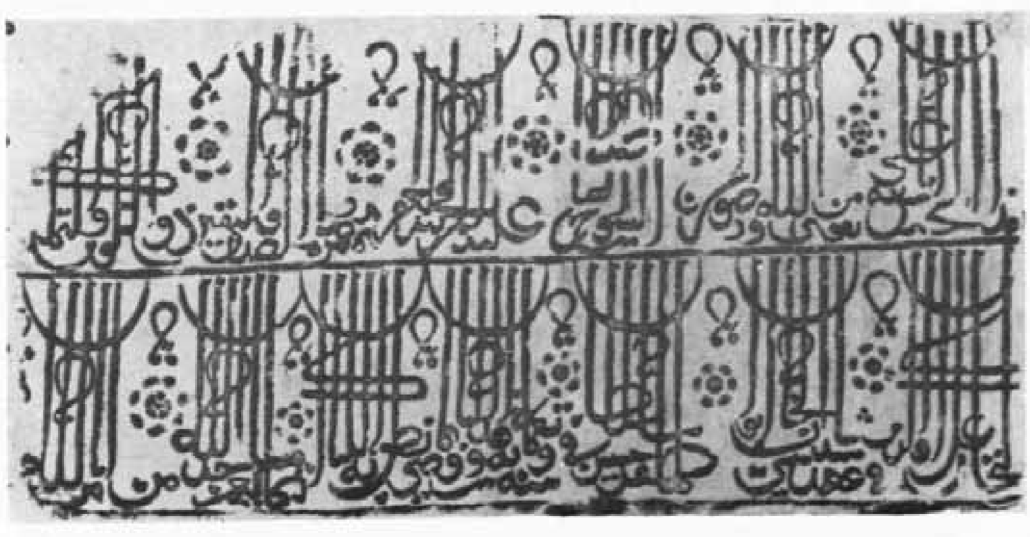


D

A-C, Melnettur : inscriptions belonging to Maravarman Sundara-Pandya I;
D, Sayalkudi: Pandyan inscription. See pp. 114-115



A

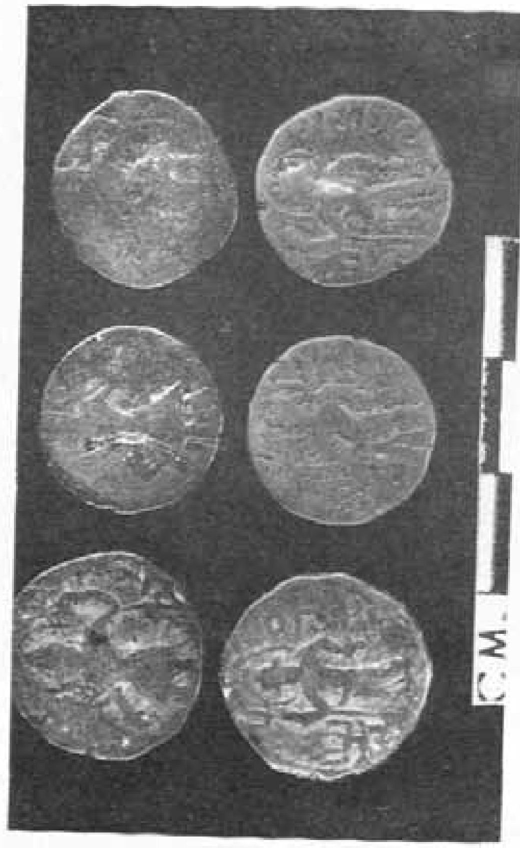


B

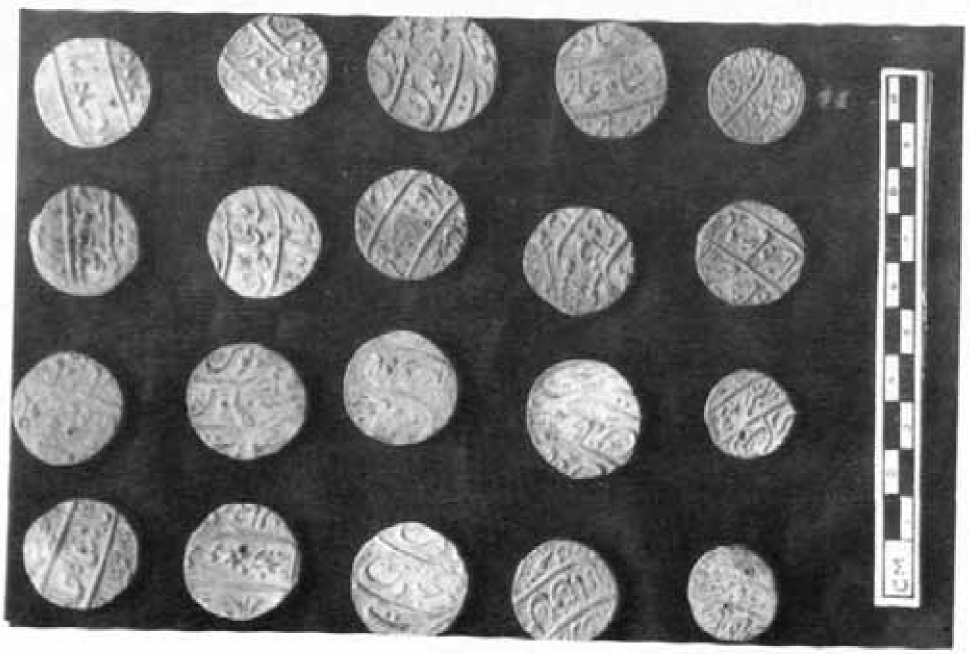
A, Chanderi : inscription of Sultans of Malwa; B, Qasba Mahso : inscription of Sultan of Bengal.
See pp. 116 and 119



B



C



A

A. Tajpur : silver coins of Mughal rulers; B-C, Calcutta: copper coins of Kushana period. See pp. 120-121



A



B

Mattencherry Palace Museum, Cochin: wooden sculptures. *See p. 135*



A



B

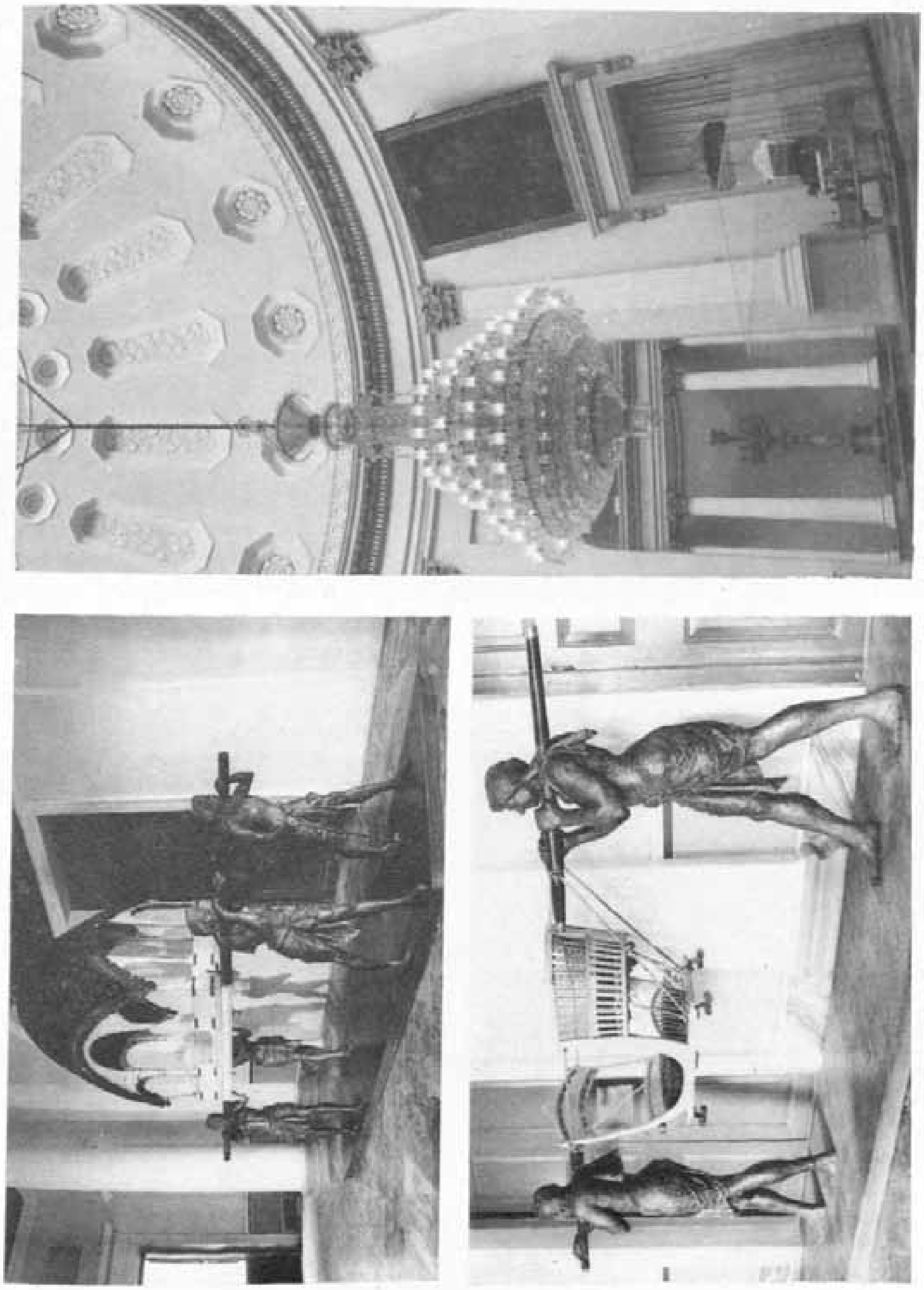


C



D

State Museum, Lucknow: A, headless sculpture and B, Uma-Mahesvara; Government Museum, Mathura: C, head of Śiva; D, Vasudhara. *See pp. 136-137*



A B C

Hazarduari Palace Museum, Murshidabad : A-B, palanquin; C, silver throne in Durbar Hall. *See p. 137*

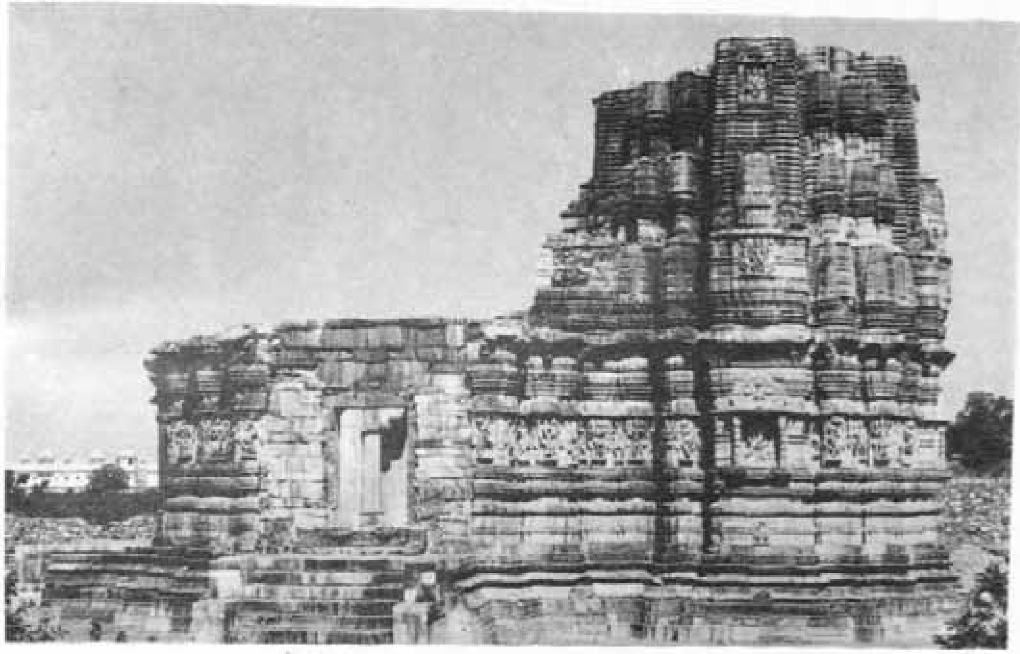


A

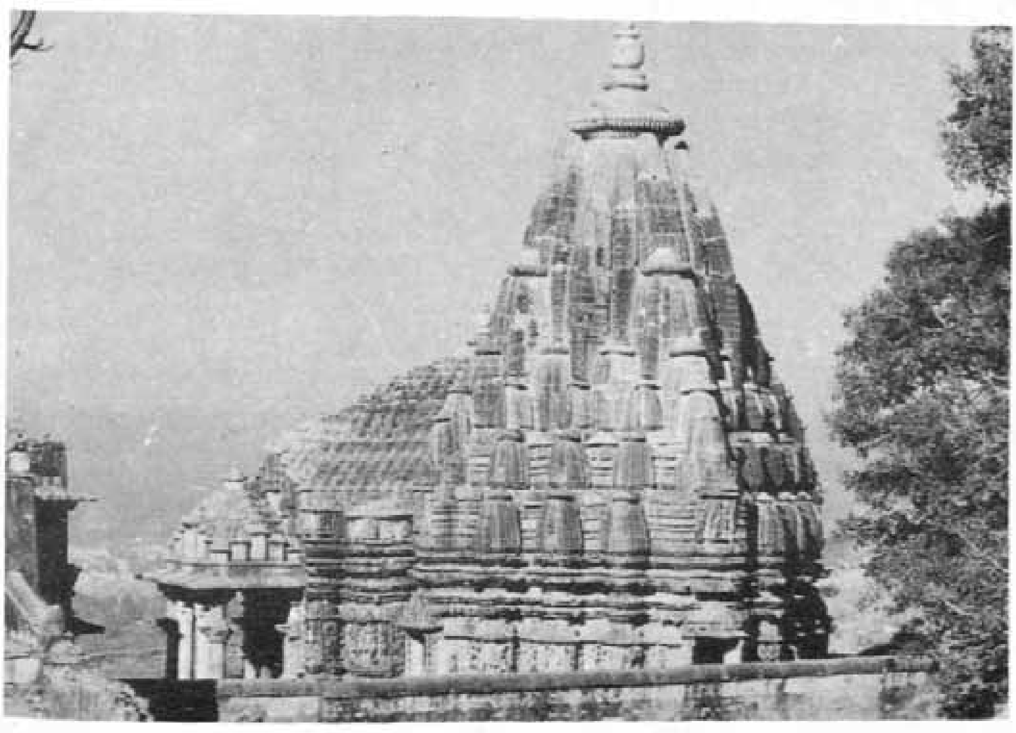


B

A, Ramgarh : Siva temple, view from west; B, Bijolia: Undesvara Mahadeva temple, view for south. *See pp. 141-142*

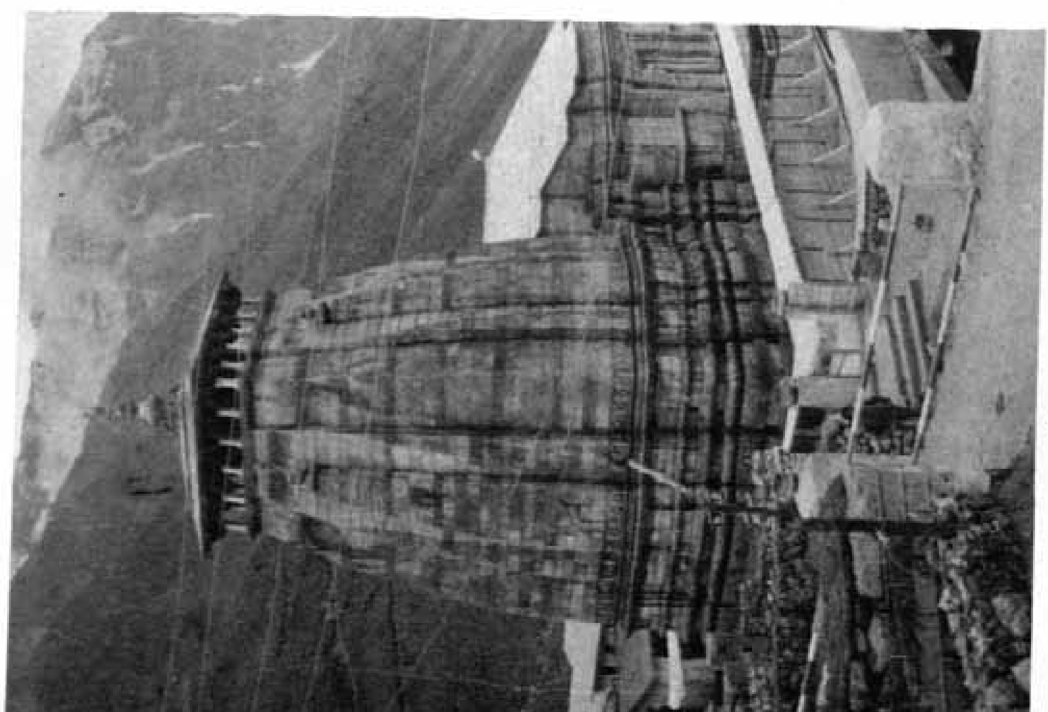


A



B

Chittaurgarh : A, Adbhuṭanatha temple, southern view; B, Samidhesvara temple, northern view.
See pp. 144-145

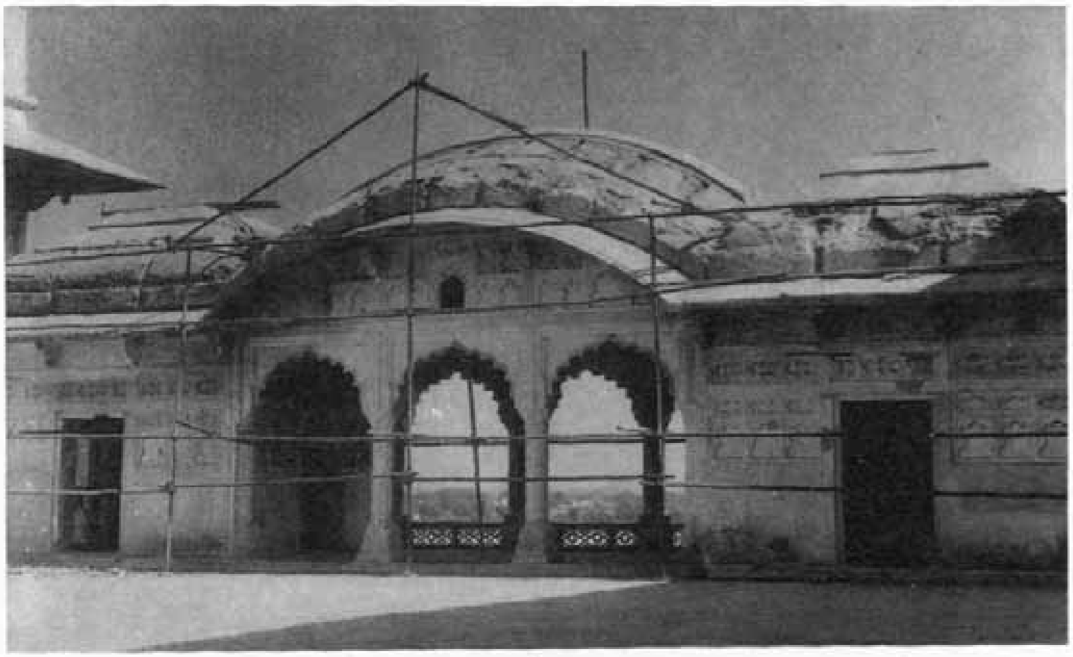


A



B

A, Kedarnath: Siva temple, view from south-west; B, Shilla: image of four-armed Vaishnavi.
See pp. 149 and 155

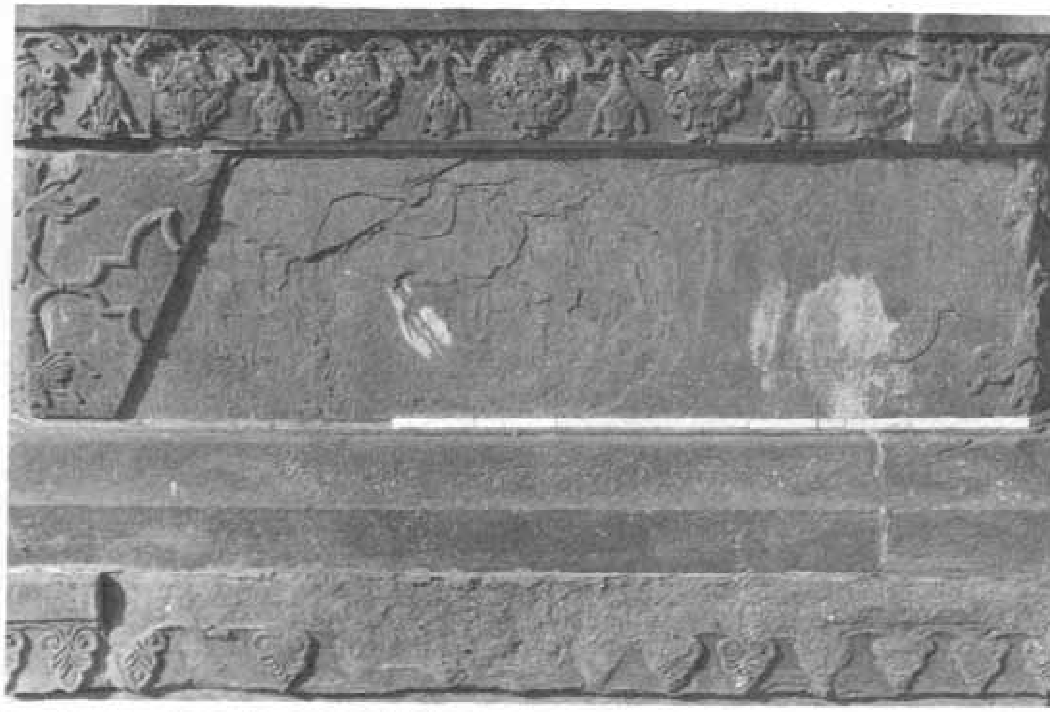


A

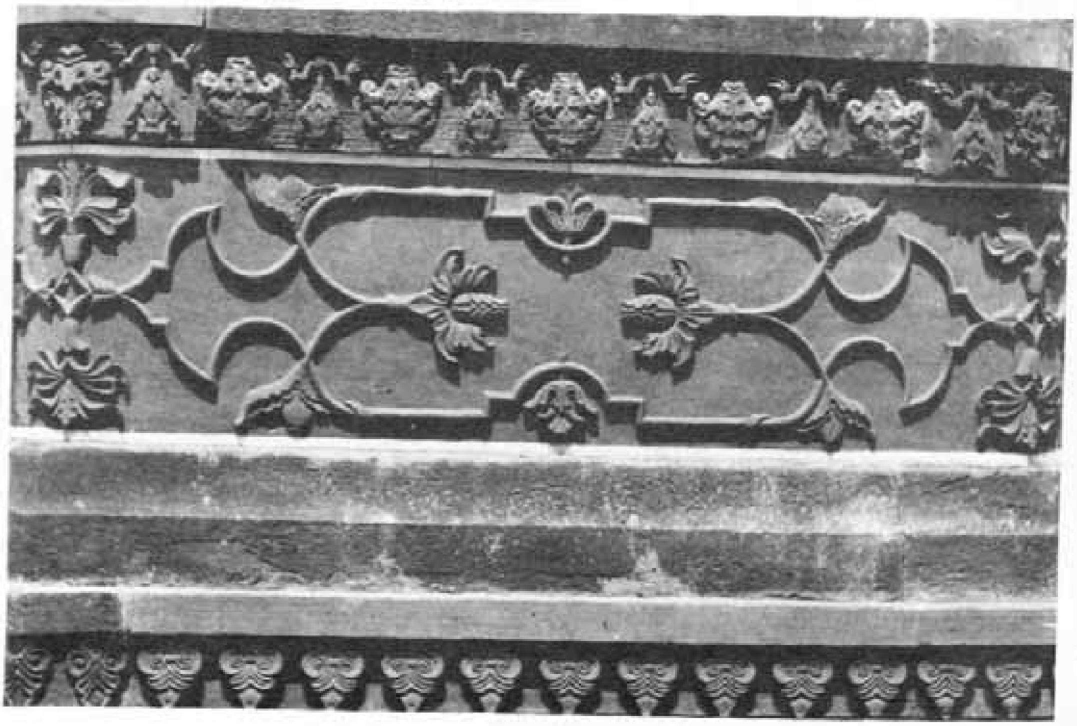


B

Agra : Agra Fort, gilded copper sheet over Roshanara pavilion, A, before and B, after conservation. See p. 156

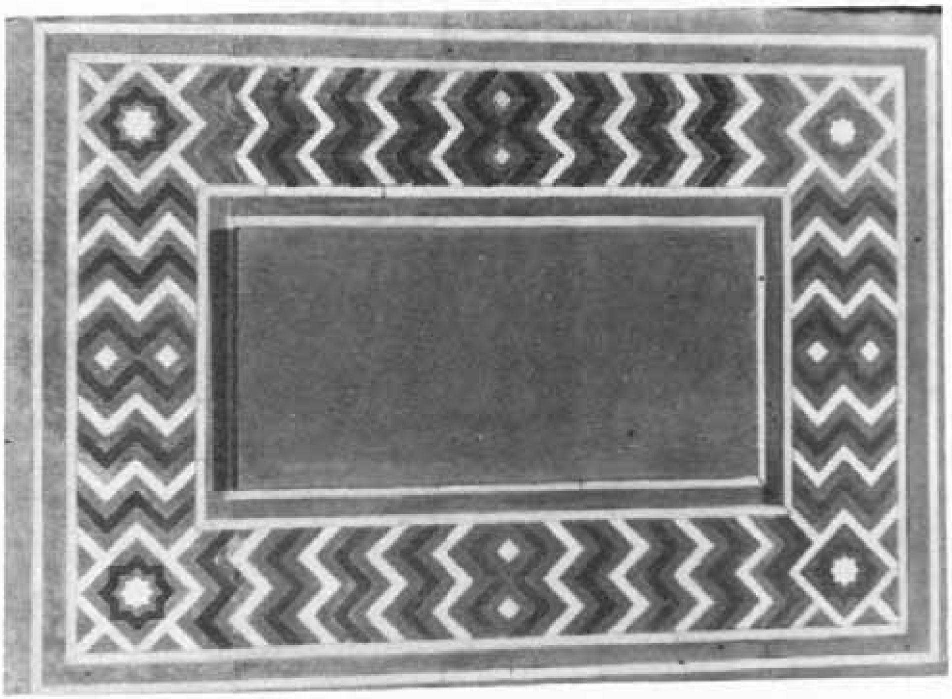


A



B

Agra: Taj Mahal, A, before and B, after restoration of ornamental panels in the north-west corner of main gate. *See p. 156*

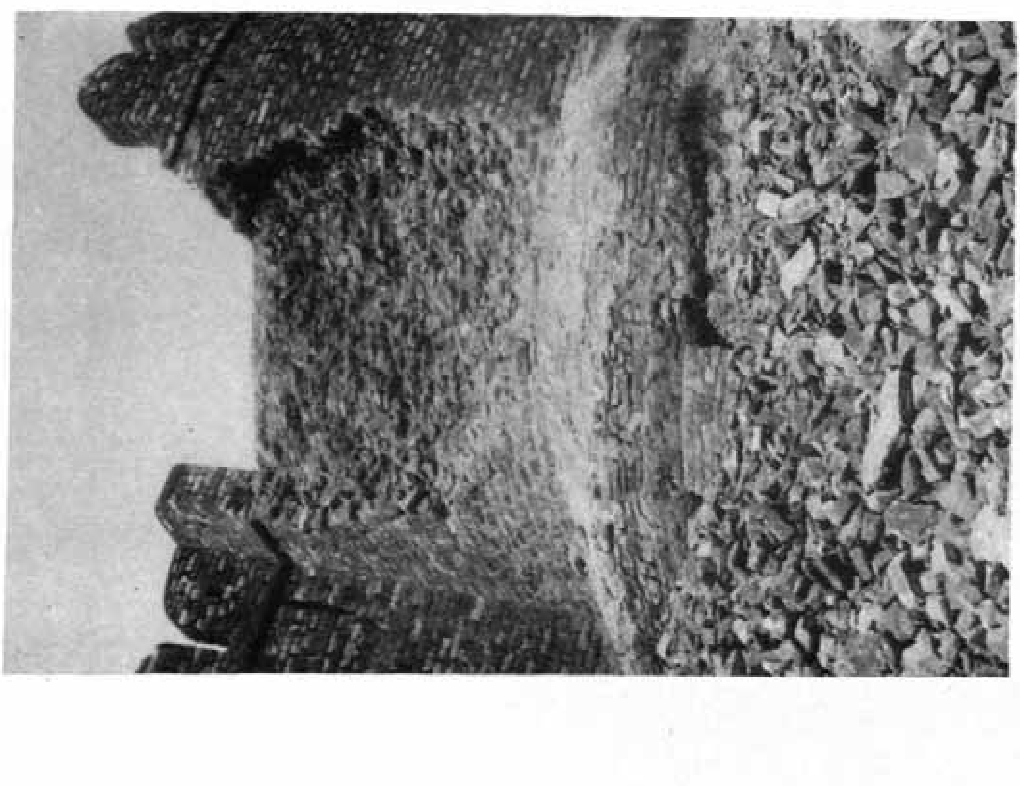


B

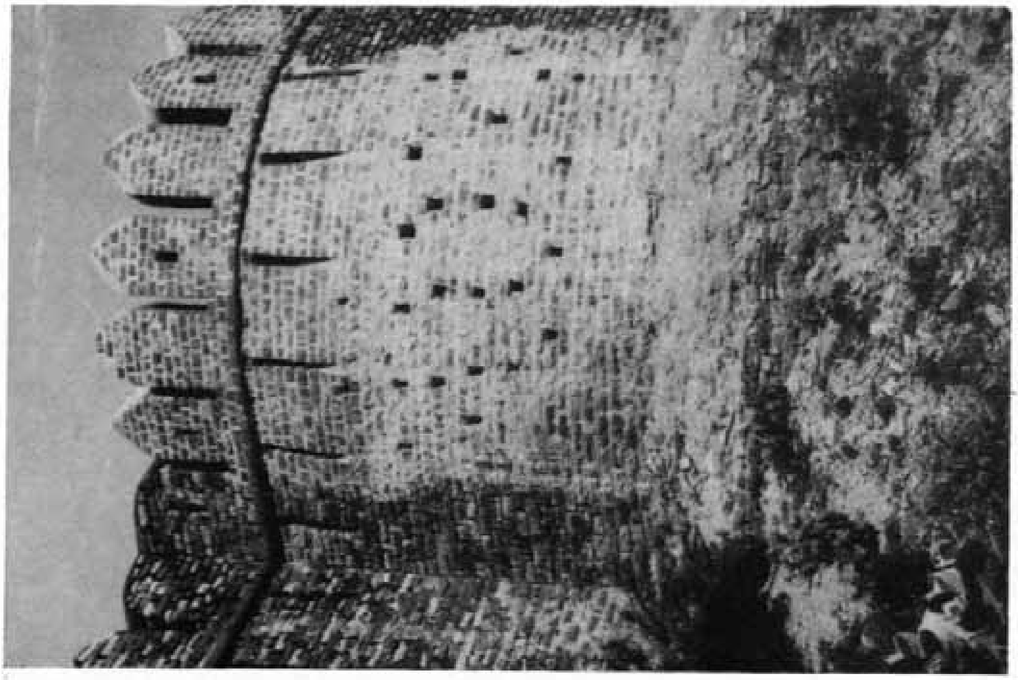


A

Agra: Taj Mahal, A, before and B, after restoration of missing inlay pieces of main gate. *See p. 156*



A



B

Fatehpur Sikri: A, before and B, after conservation of bastion of the fortification wall. *See p. 157*



A

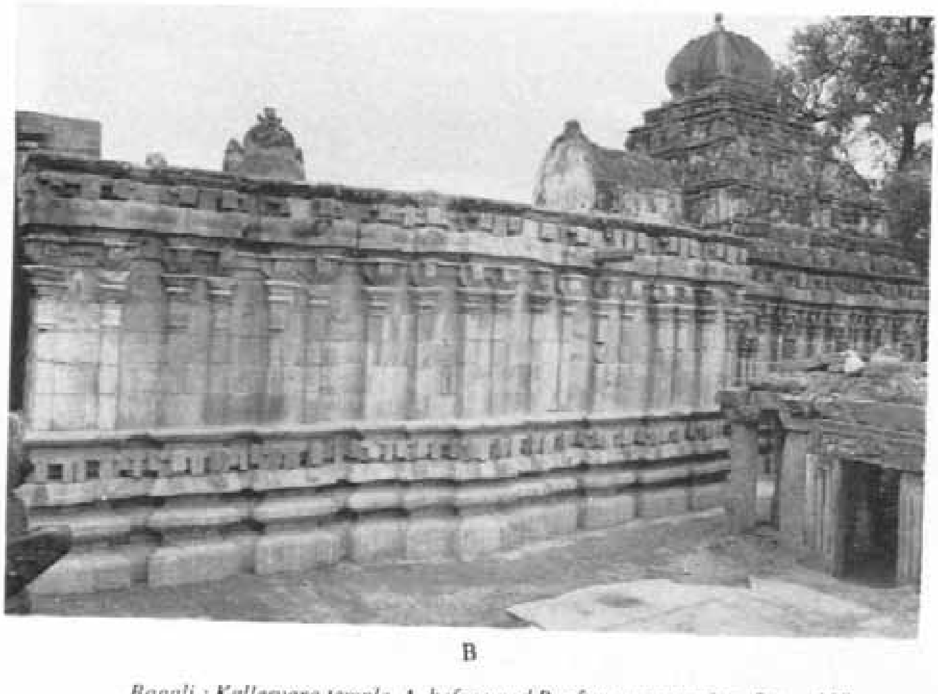


B

Angoor:Kallesvara temple, A, before and B, after conservation. *See p. 158*



A

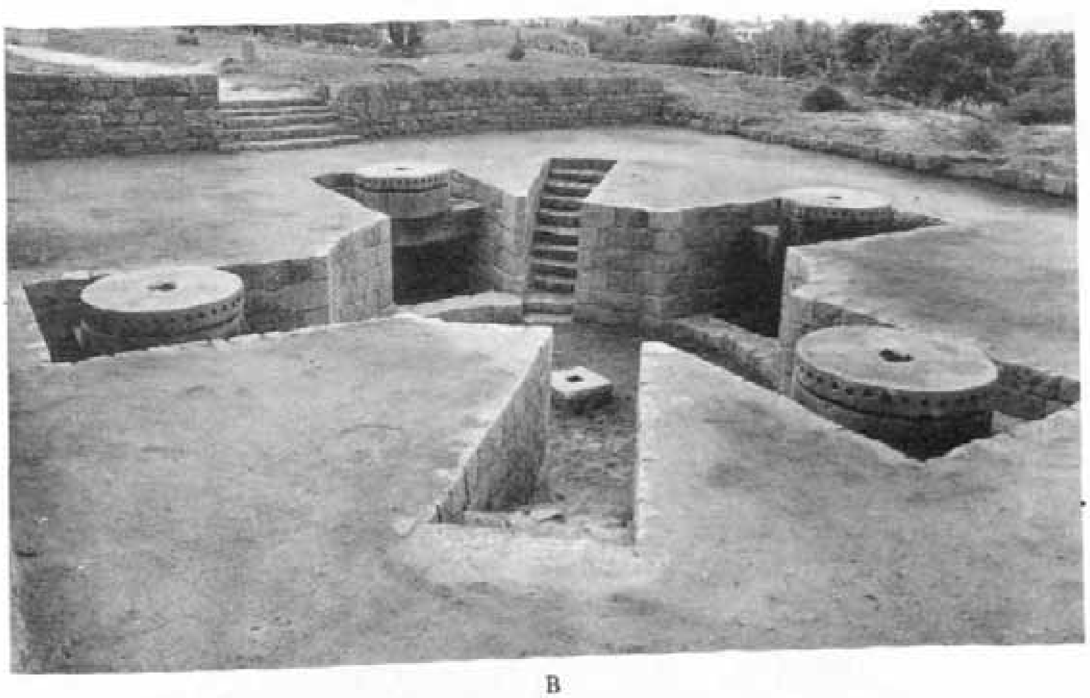


B

Bagali : Kallesvara temple, A, before and B, after conservation. *See p. 158*



A



B

Chitradurga : Fort, A, before and B, after reconstruction of wall of Maddu Bisuvakallu. *See p. 160*

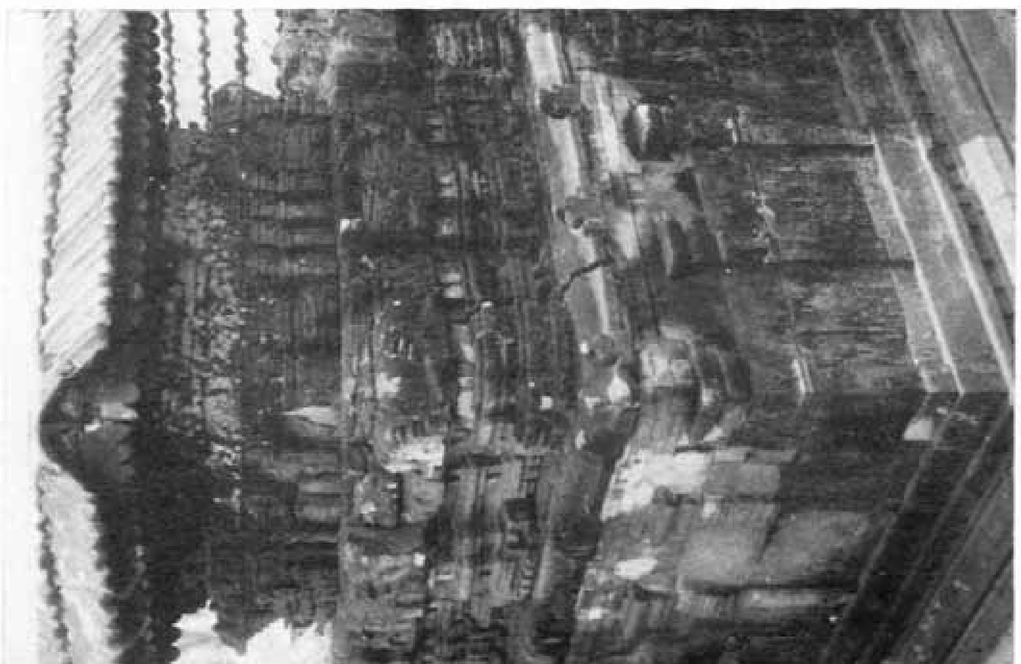


A

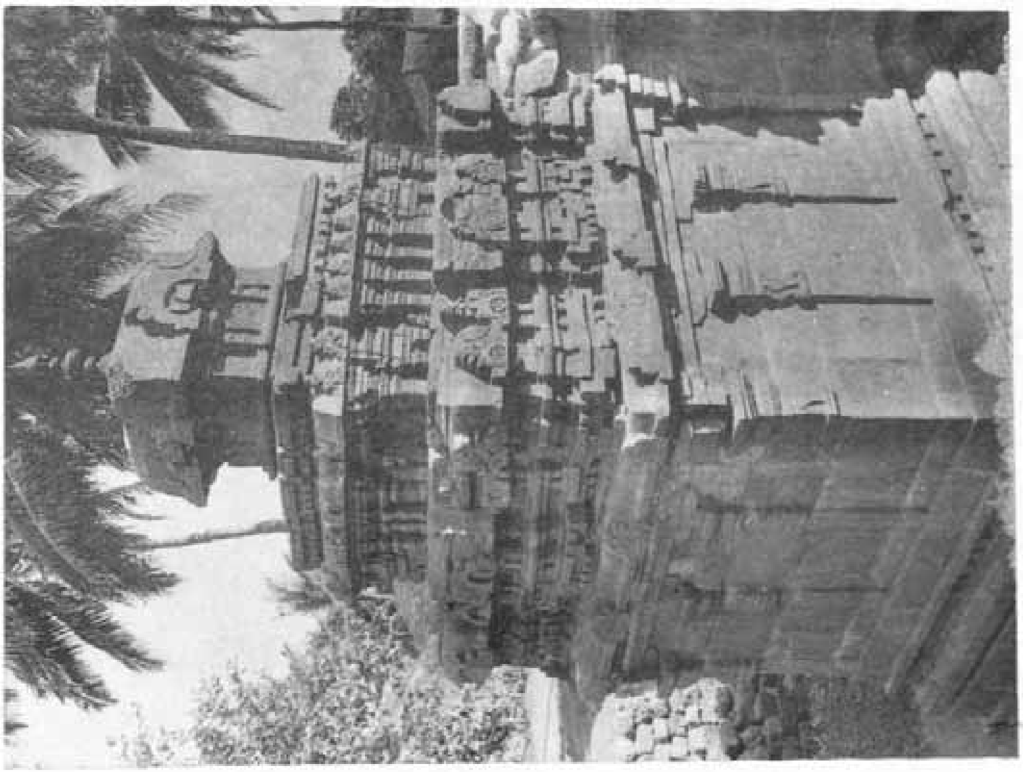


B

Belur: Kesava temple, A, before and B, after mending of stucco figures. See p. 160



A



B

Humcha: Parsvanatha basti, A, before and B, after conservation of the sikhara. *See p. 161*



A



B

Lalitagiri : apsidal chaitya, A, before and B, after conservation. See p. 166



A



B

Lalitagiri: apsidal chaitya, A, before and B, after conservation. See p. 166

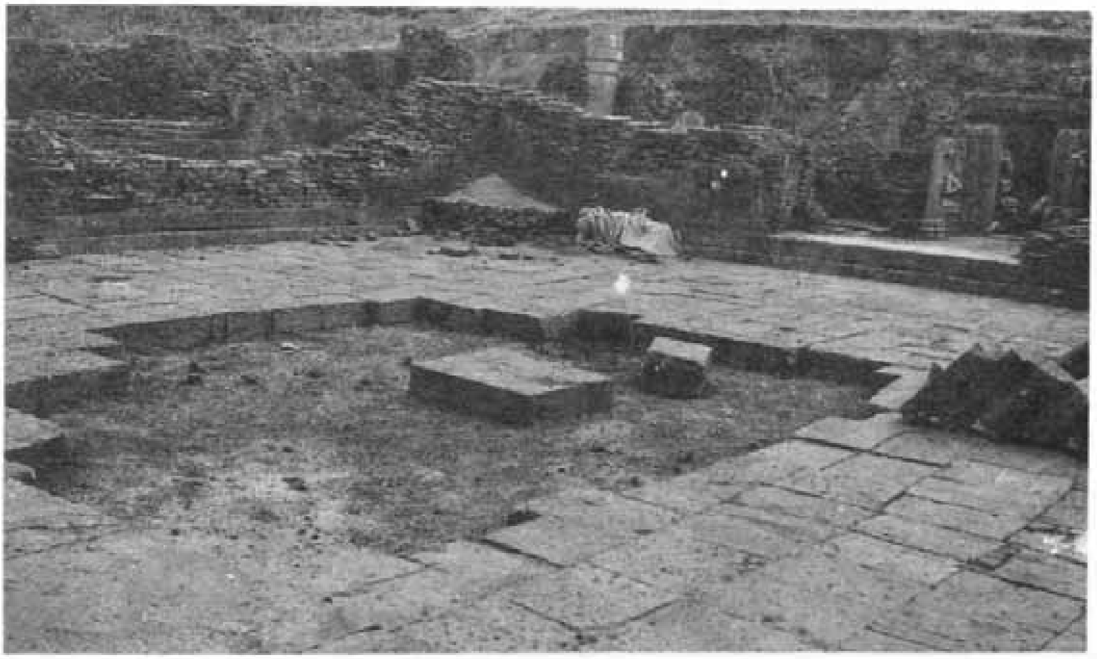


A



B

Lalitagiri : apsidal chaitya, A, before and B, after conservation. *See p. 166*



A



B

Udayagiri : Stupa, A, before and B, after conservation. See p. 166

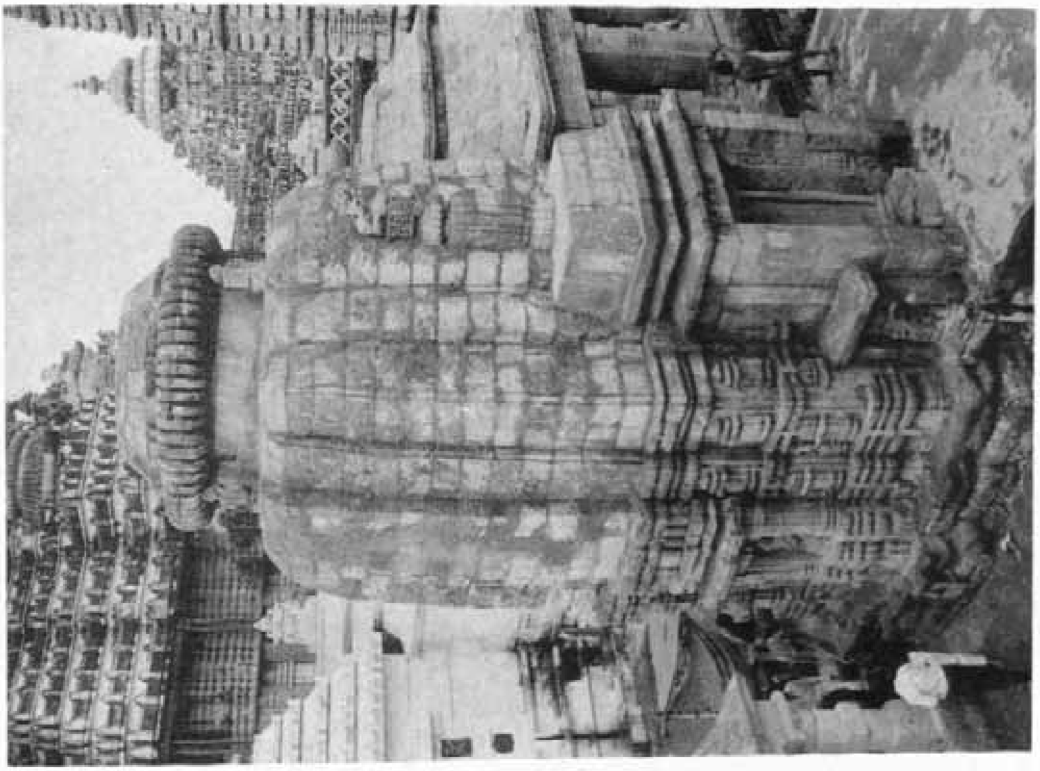


A

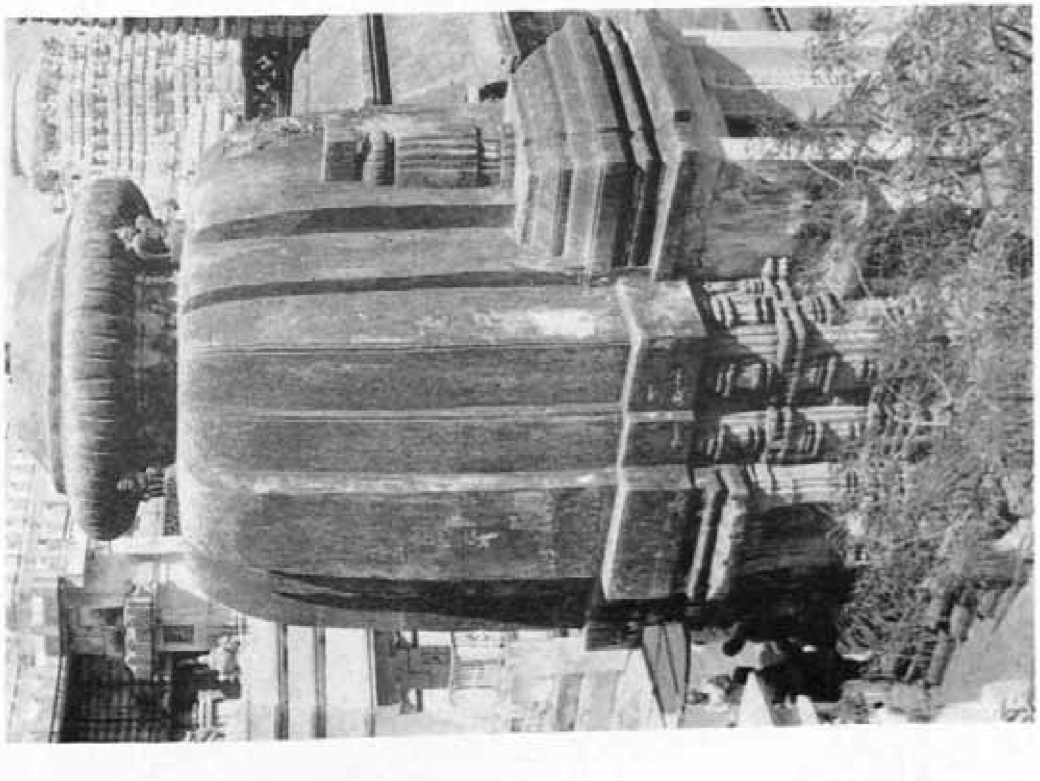


B

Bhubaneswar : Lingaraja temple, A, before and B, after repairs of the courtyard. *See p. 167*

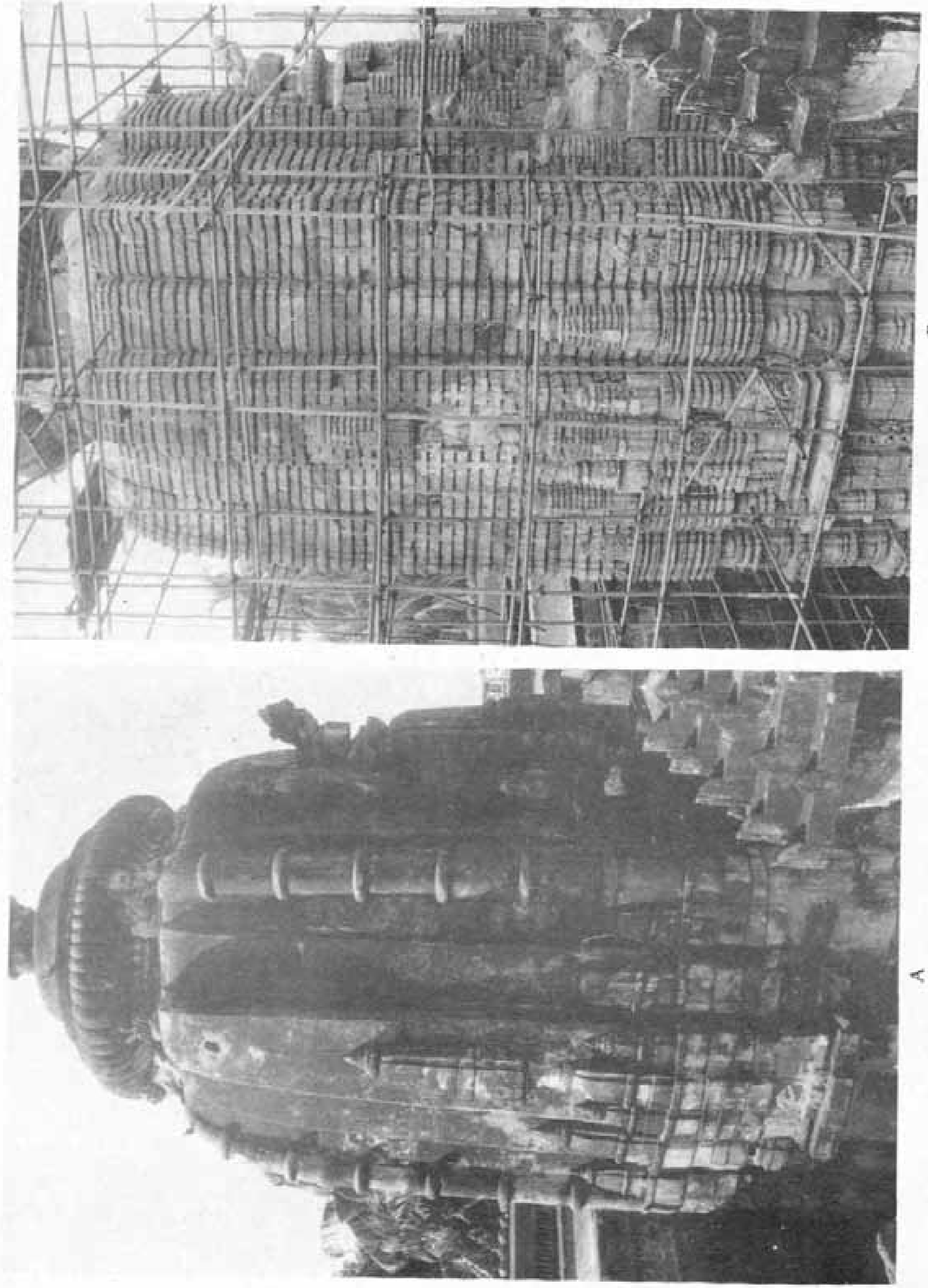


B



A

Puri : Jagannatha temple, A, before and B, after deplastering of Ganesa temple. See p. 167



B

A

Puri : Jagannatha temple complex, A, before and B, after deplastering of Vimala temple. *See p. 167*

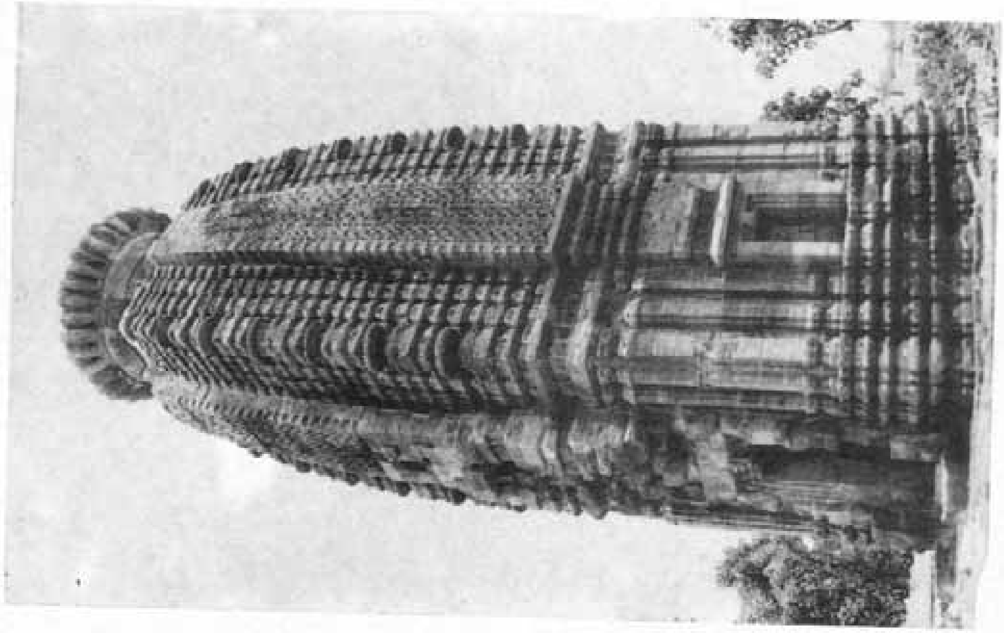


A

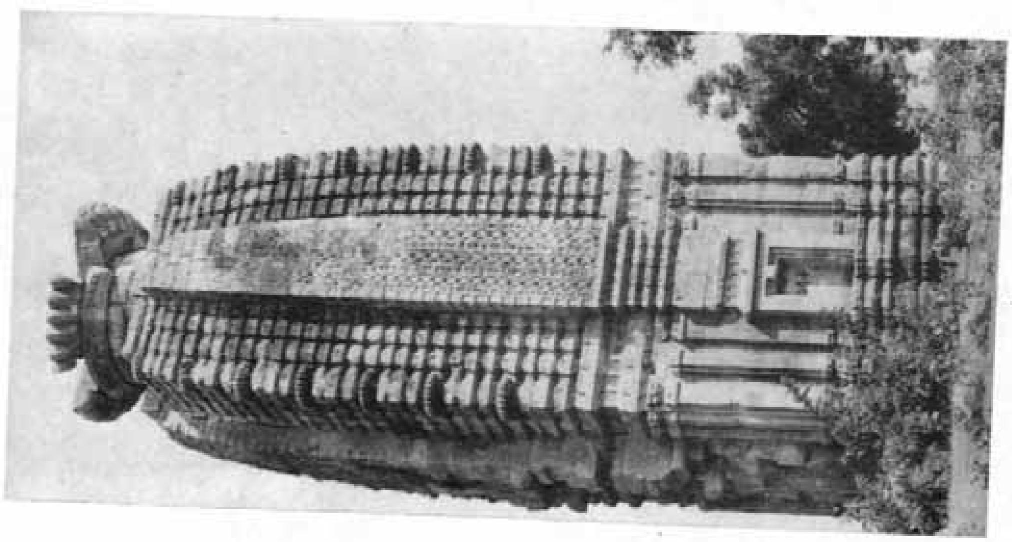


B

Murshidabad : Imambara, A, before and B, after conservation. *See p. 169*

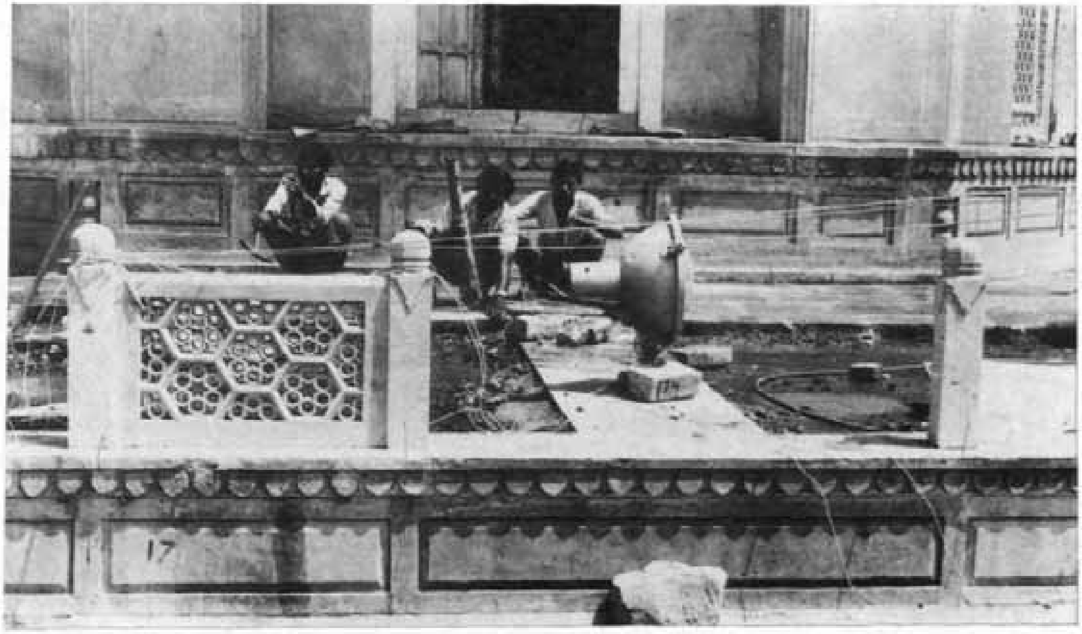


B

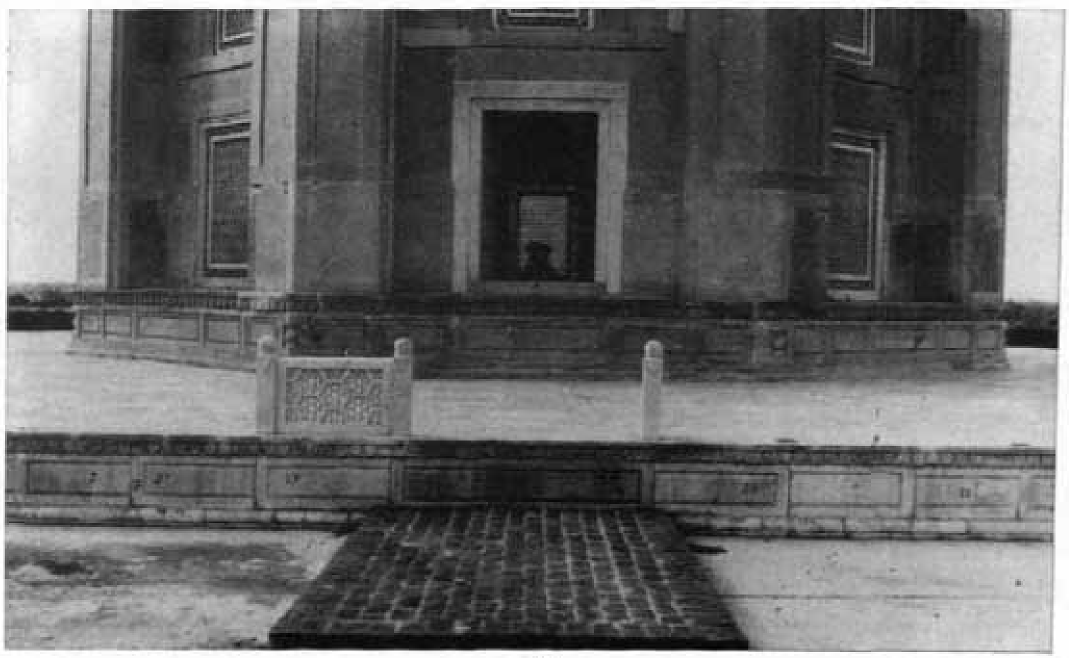


A

Banda : temple, A, before and B, after conservation. *See p. 169*

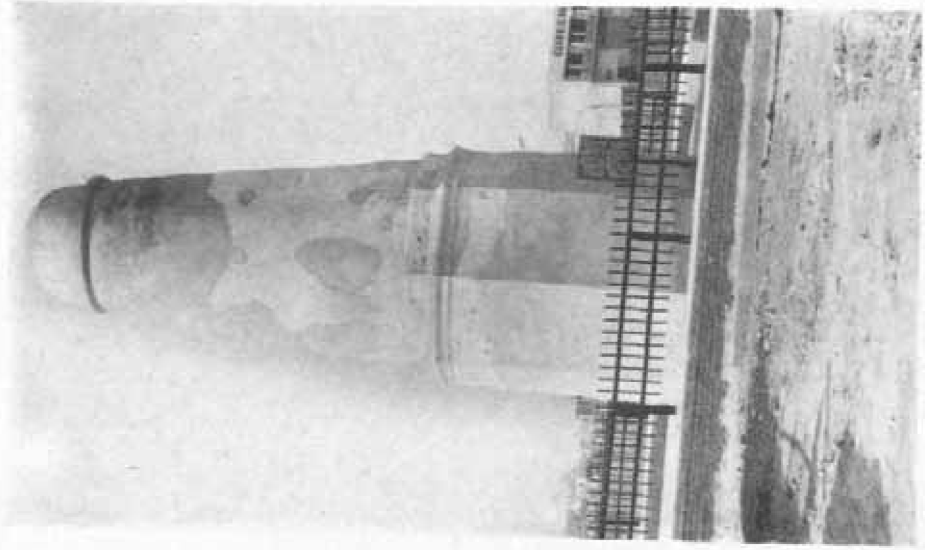


A

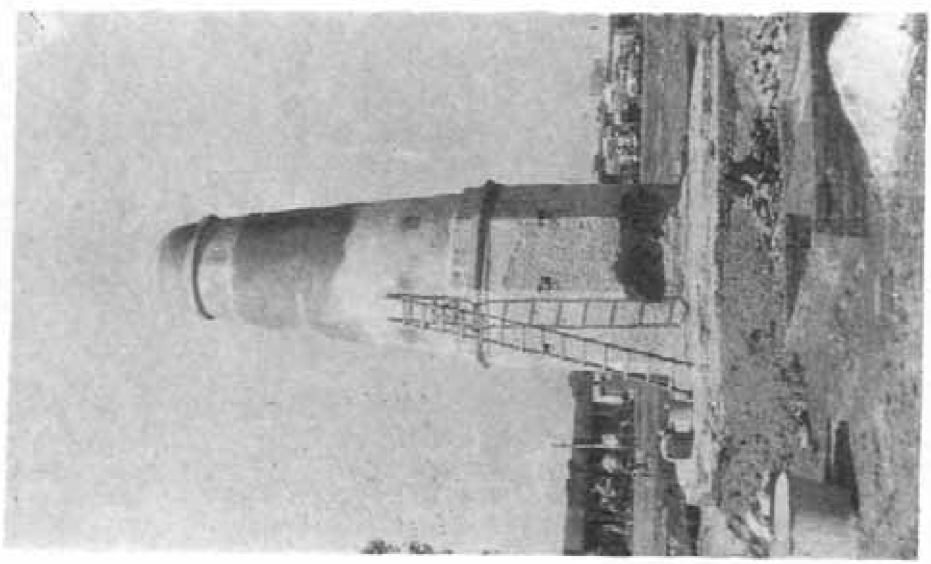


B

Thanesar : Shaikh Chilli's tomb, A, before and B, after resetting of marble flooring. *See p. 169*

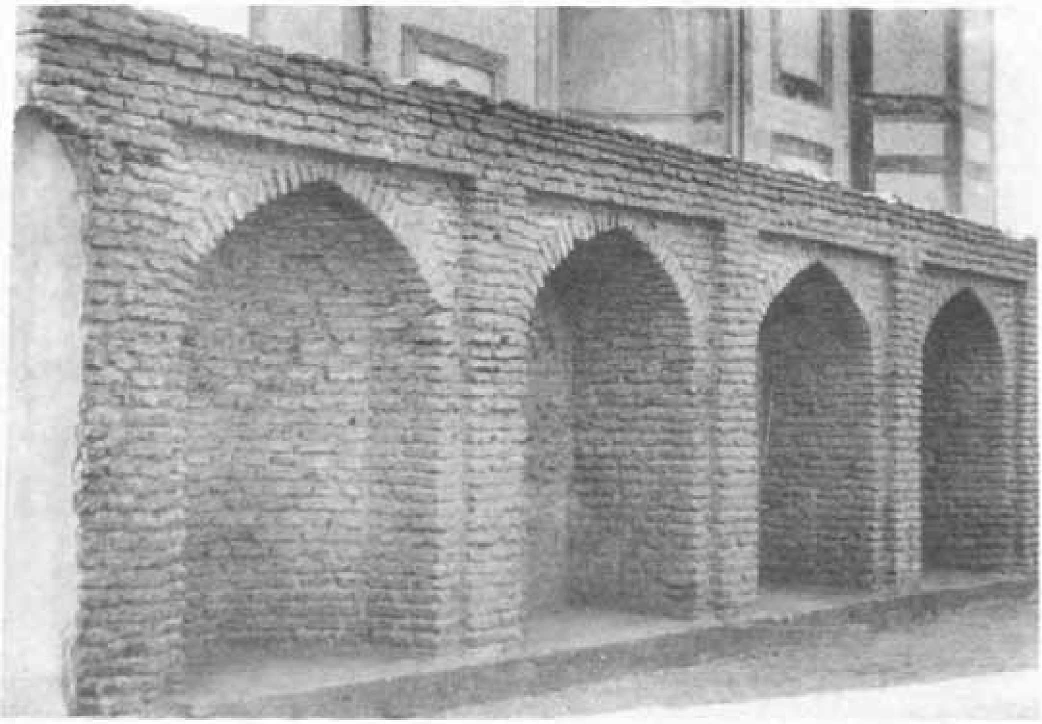


B

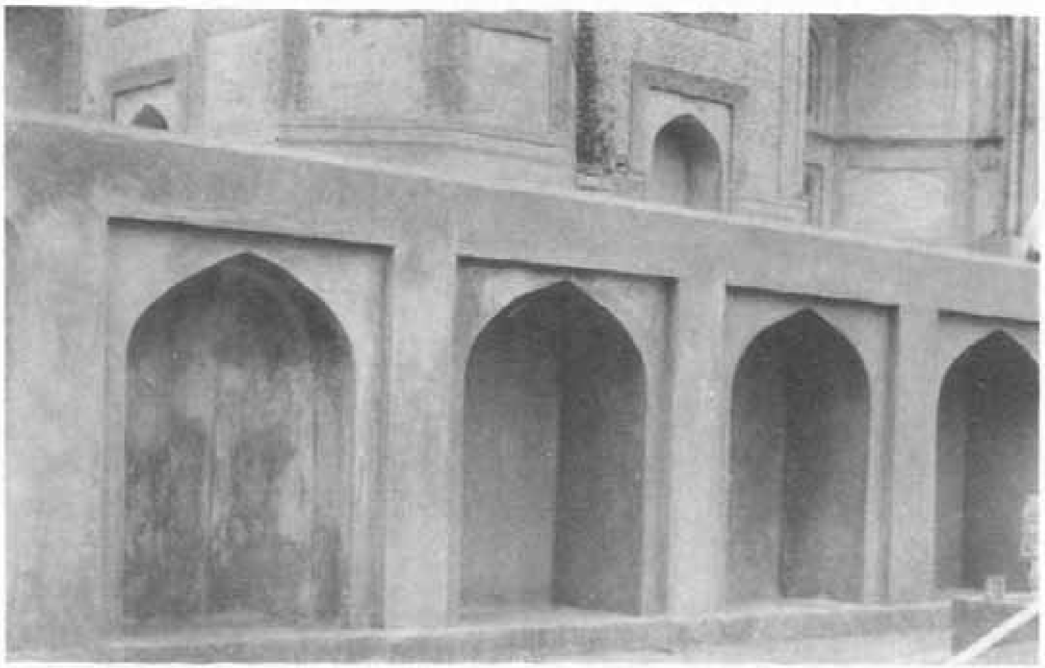


A

Ludhiana : Kos Minar, A, before and B, after conservation. *See p. 170*



A



B

Nakodar: tombs of Mohammad Momin and Haji Jamal. A, during and B, after conservation. See p. 170



A

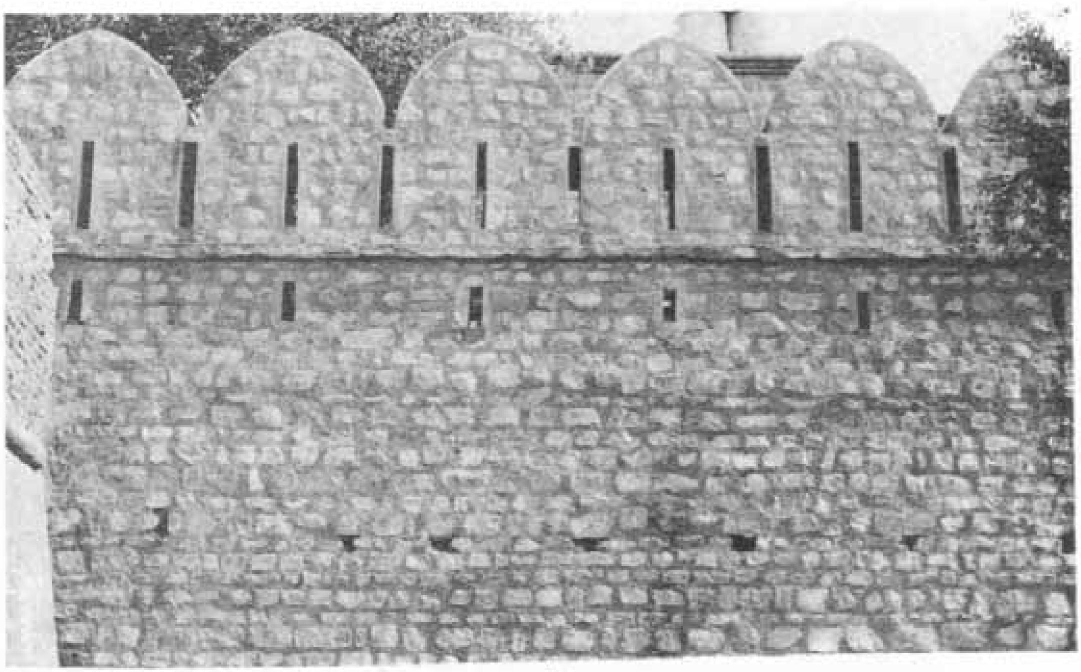


B

Nur Mahal : Nur Mahal Sarai, A, before and B, after conservation. *See p. 170*



A

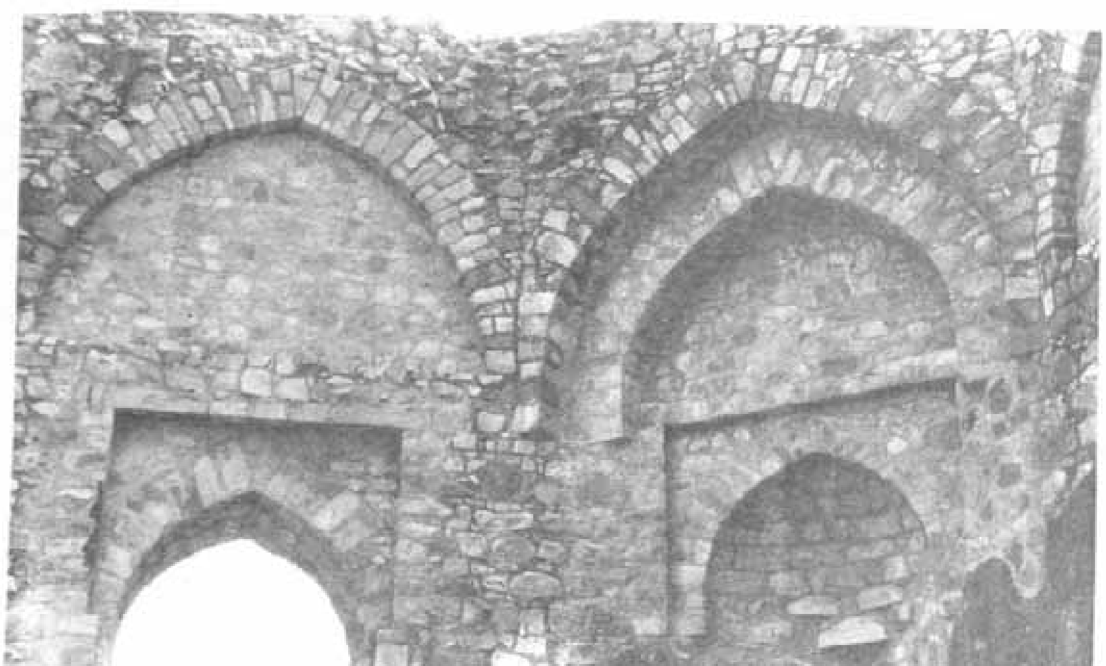


B

Delhi : Kashmiri Gate, A, before and B, after conservation. See p. 170



A

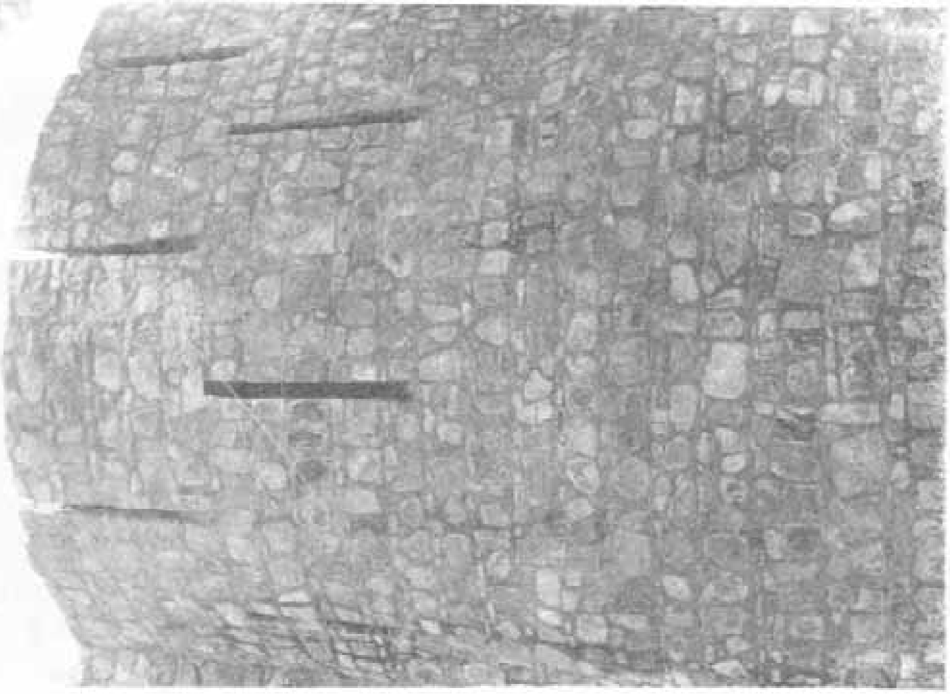


B

New Delhi: Ghiyathud-Din Balban's tomb, A, before and B, after repairs. *See p. 171*

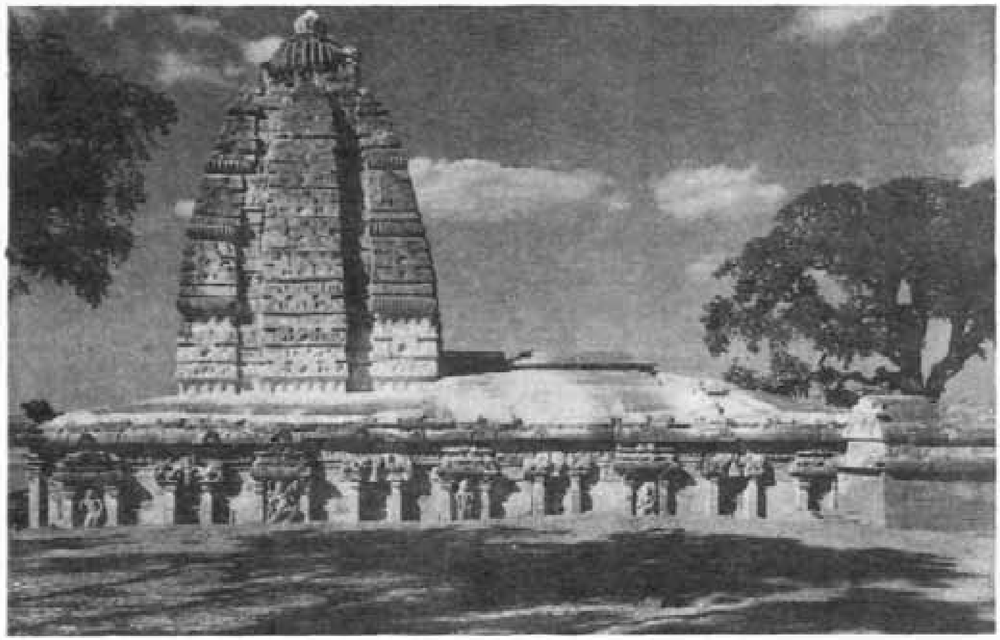


A

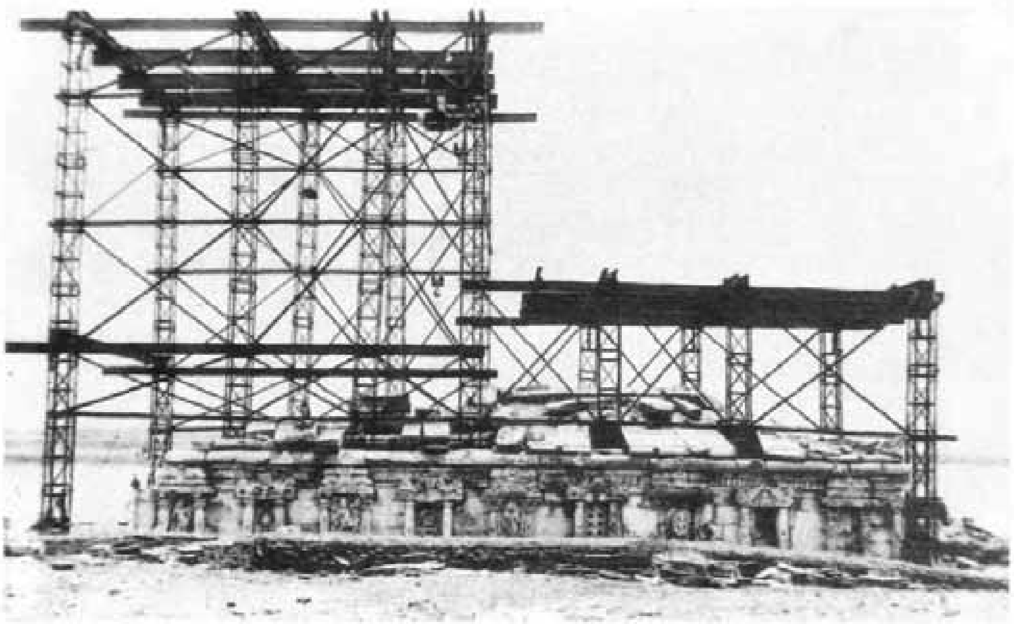


B

New Delhi : Kotla Firuz Shah, A, before and B, after restoration of bastion. *See p. 171*

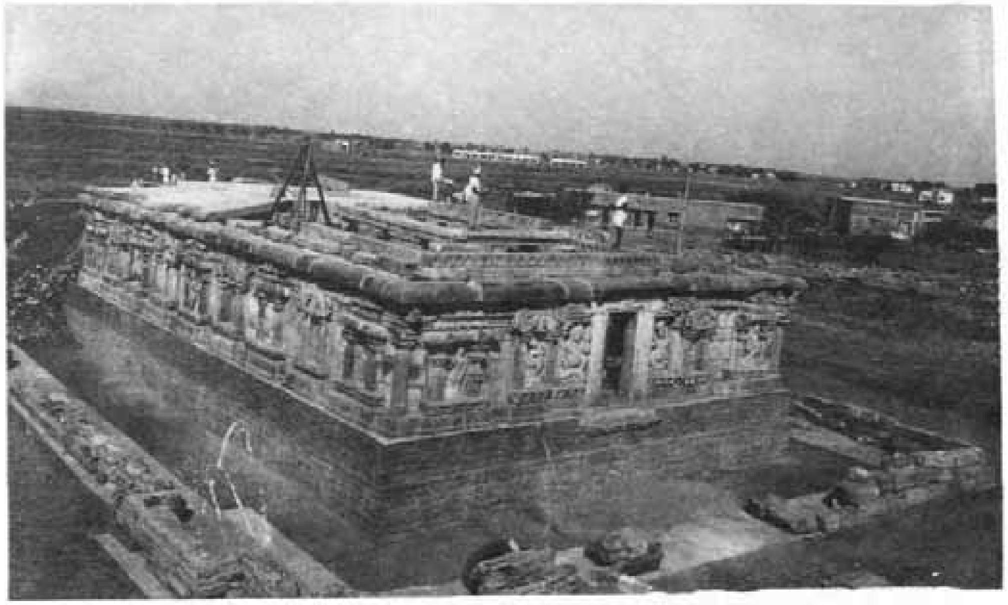


A

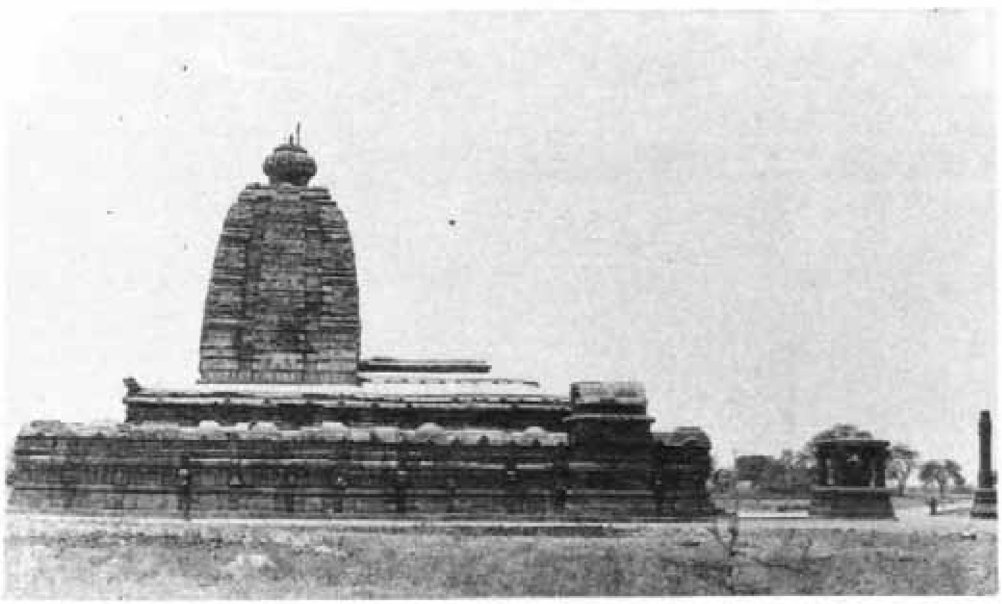


B

Alampur : Kudali Sangamesvara temple A, before and B, during dismantling of the temple. See p. 174



A

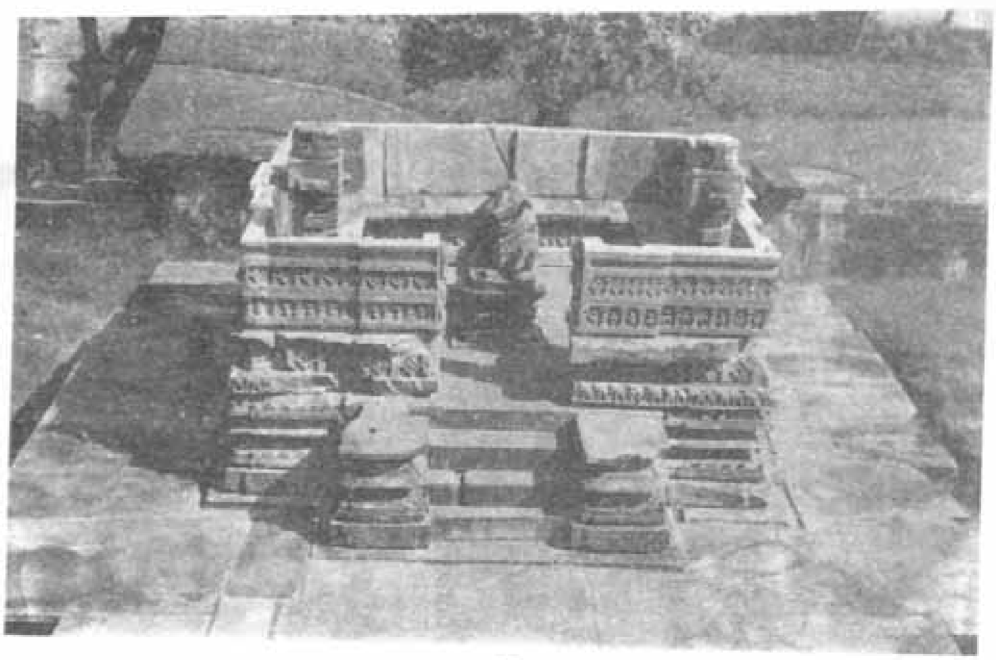


B

Alampur : Kudali Sangamesvara temple, A, during and B, after reconstruction of the temple. See p. 174



A

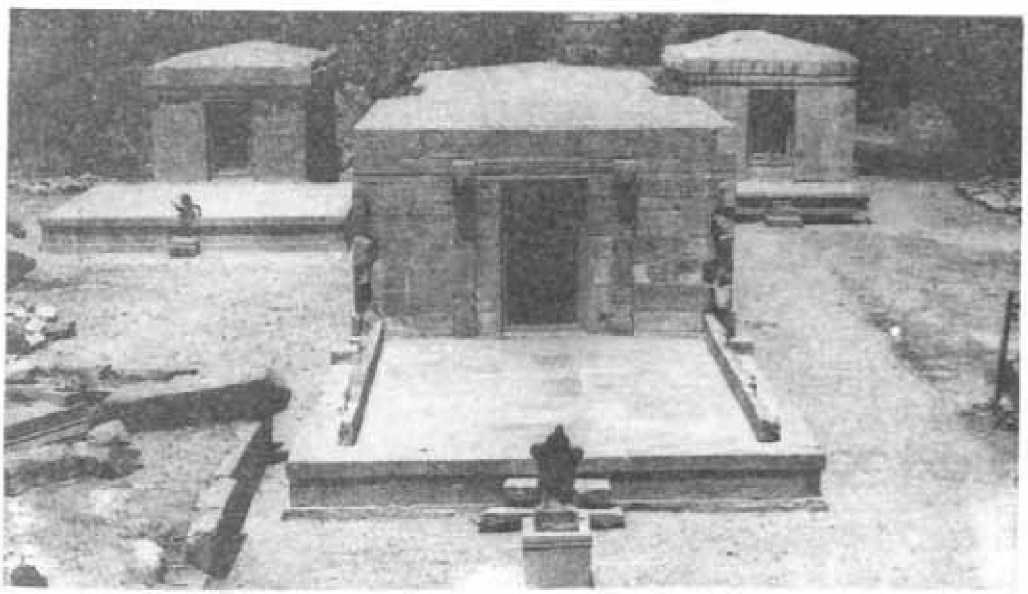


B

Palampet : Nandi-mandapa, A, before and B, after reconstruction. See p. 174

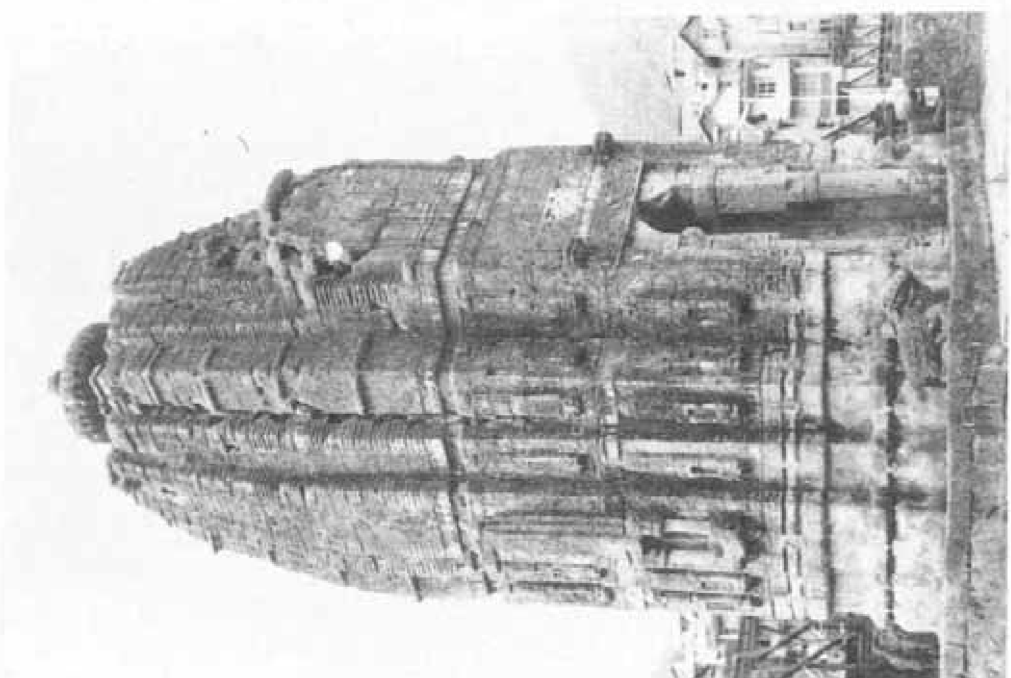


A

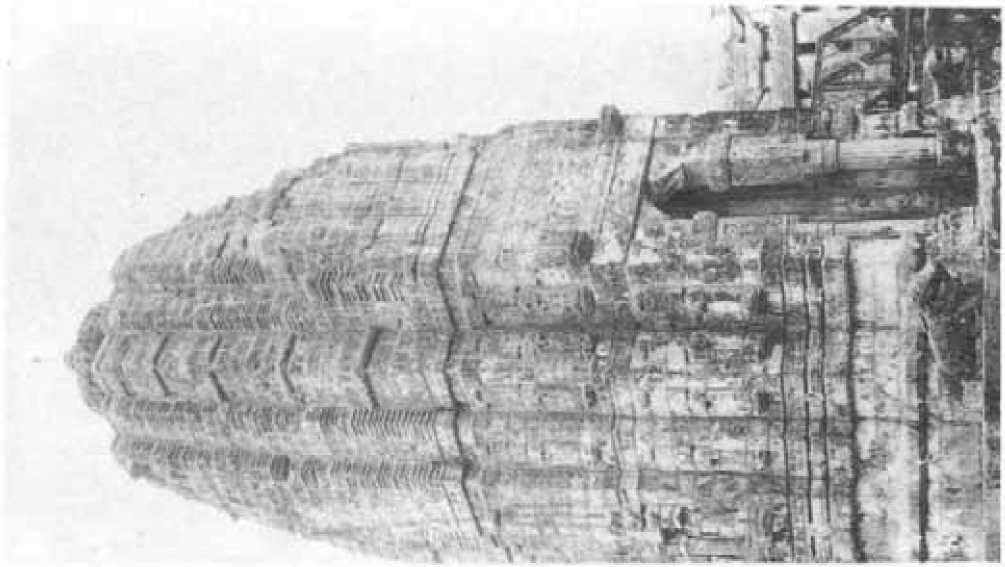


B

Vayalur : Thiruppulisvara temple, A, before and B, after repairs. See p. 179

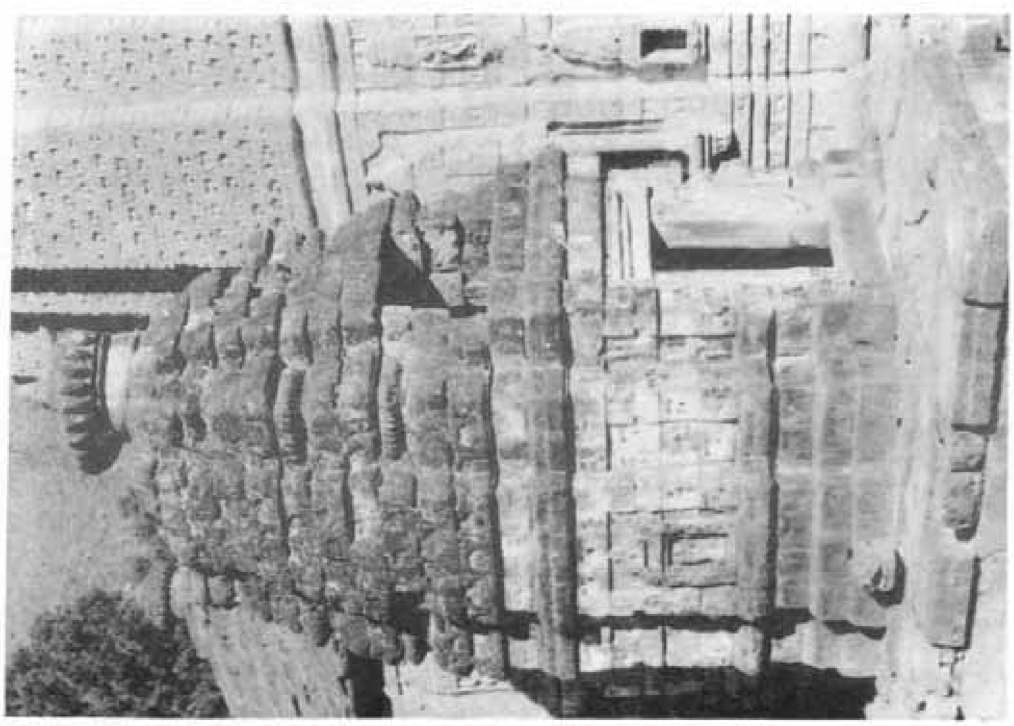


A

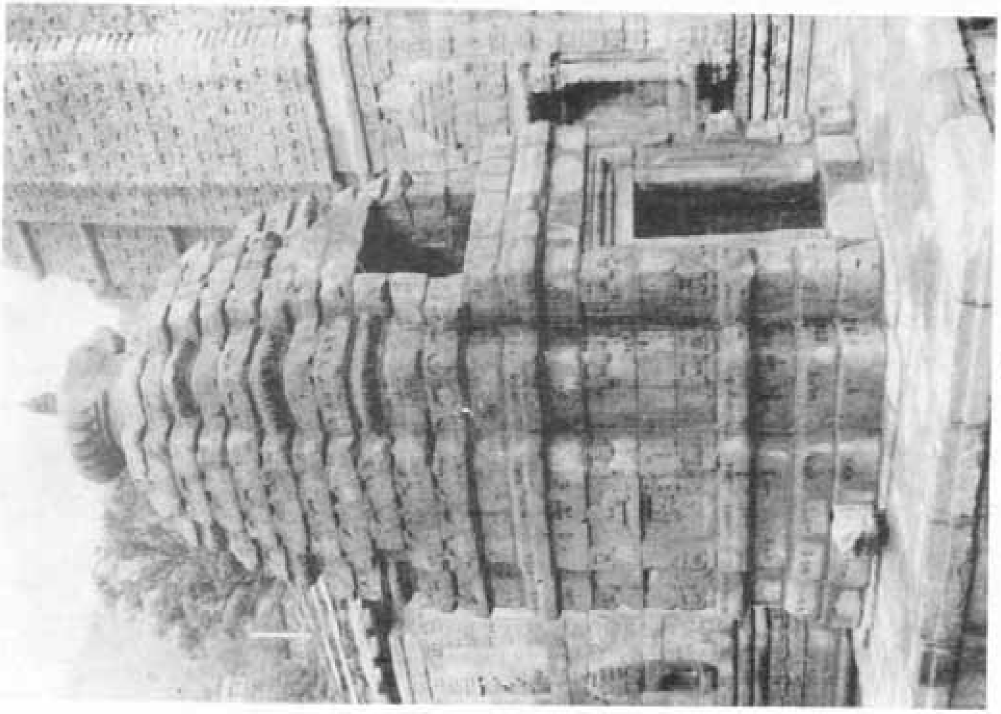


B

Mandi : Batuka Bhairava temple, A, before and B, after repairs of the sikhara. *See p. 184*



A



B

Mandi : Trilokinath temple, A, before and B, after repairs of miniature sikhara temple. *See p. 184*



A



B

Parihasapura : Stupa, A, before and B, after repairs to the steps. See p. 184

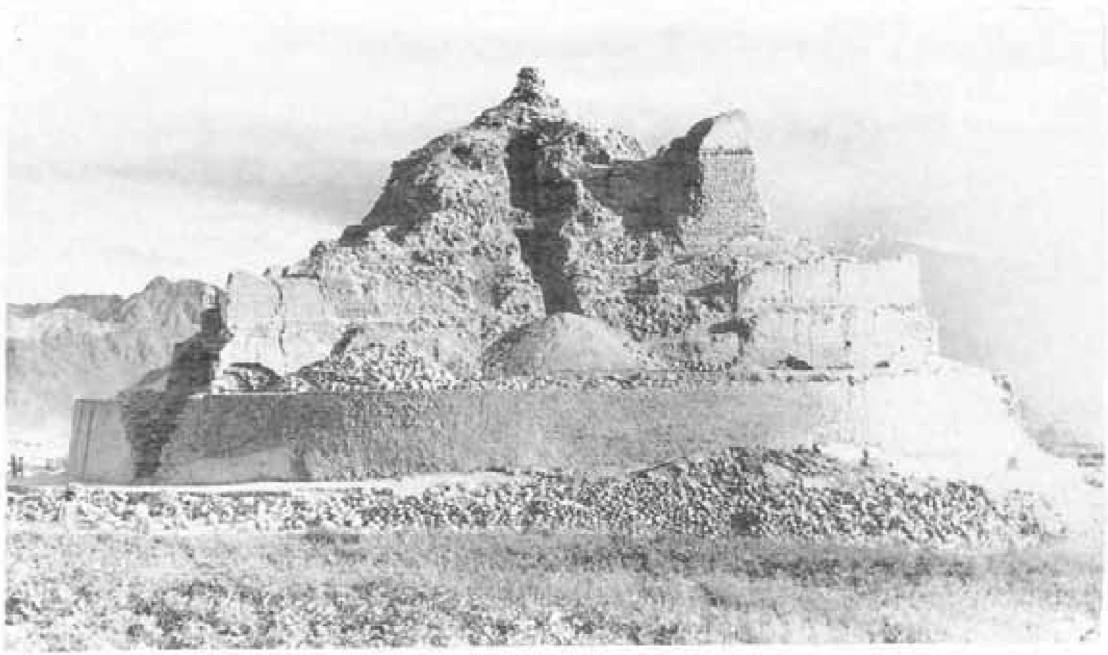


A



B

Parihasapura : Chaitya, A, before and B, after repairs. See. p. 185



A



B

Leh : Tisseru Stupa, A, before and B, after repairs. See p. 185



A



B

Avantipur : Avantiswami temple, A, before and B, during repairs. See p. 185



A



B

Avantipur : Avantisvara temple, during conservation. See p. 185

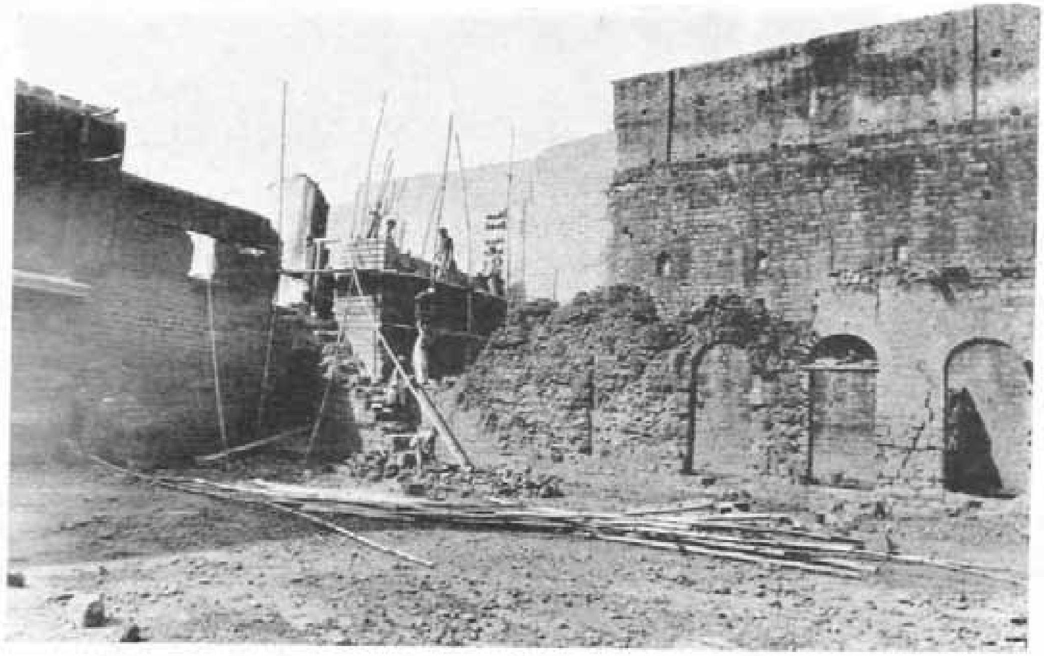


A

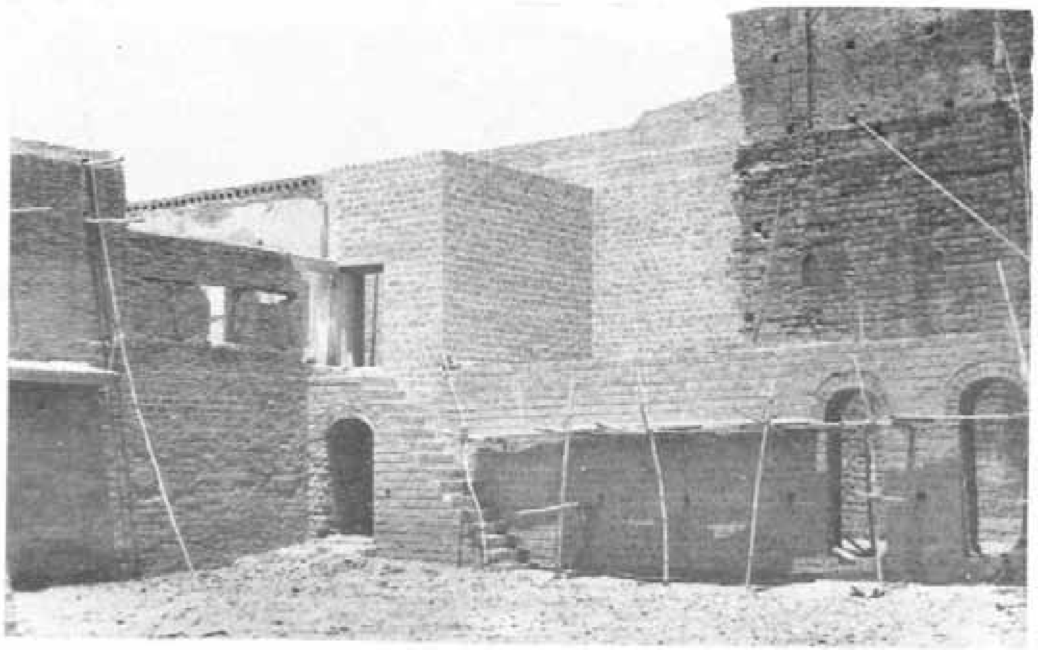


B

Kiramchi : A, before and B, after conservation of Temple 4. See p. 186

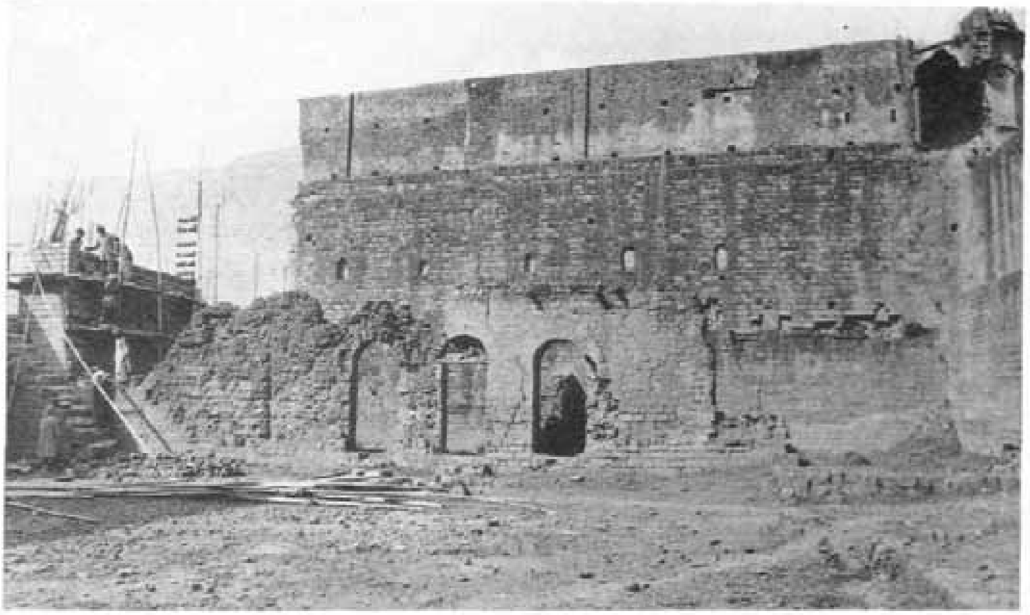


A

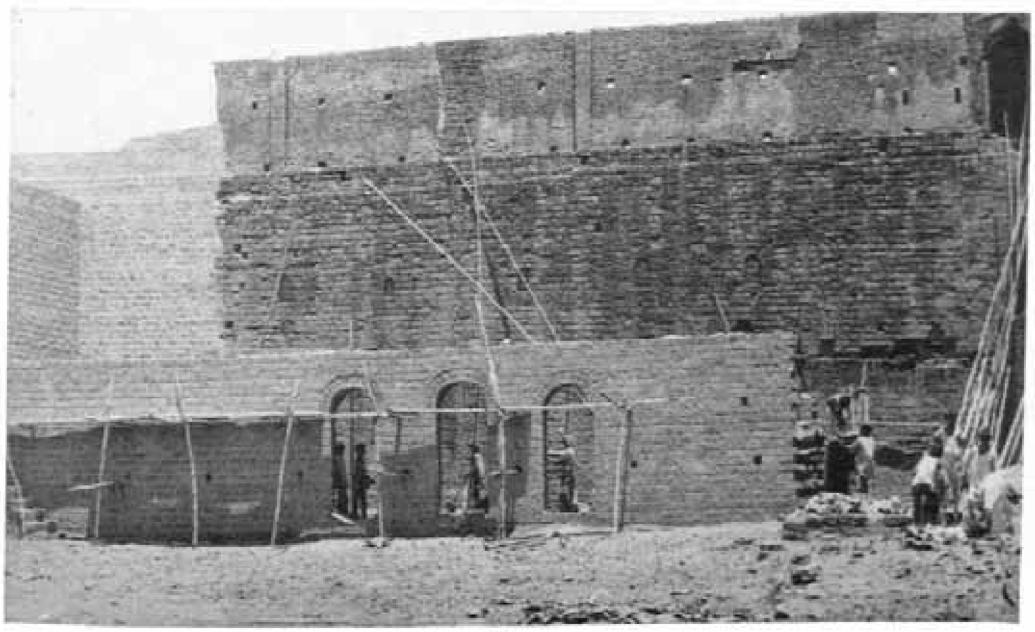


B

Ramnagar: Purana Mahal, A, before and B, after conservation. See p. 186



A



B

Ramnagar : Purana Mahal, A, before and B, after repairs. See p. 186

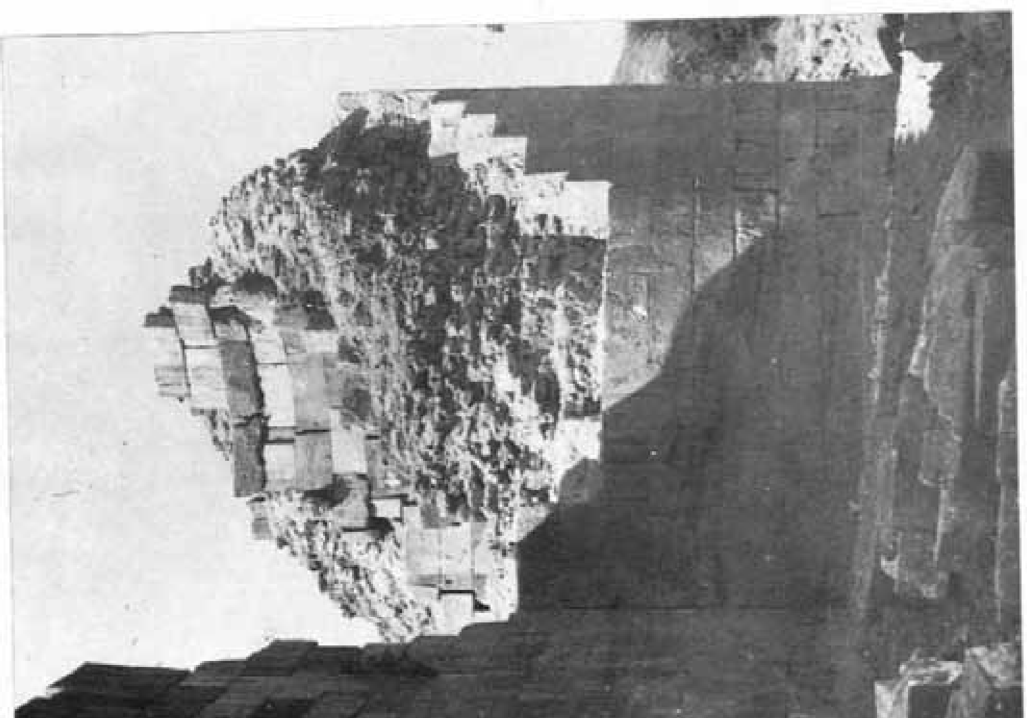


A

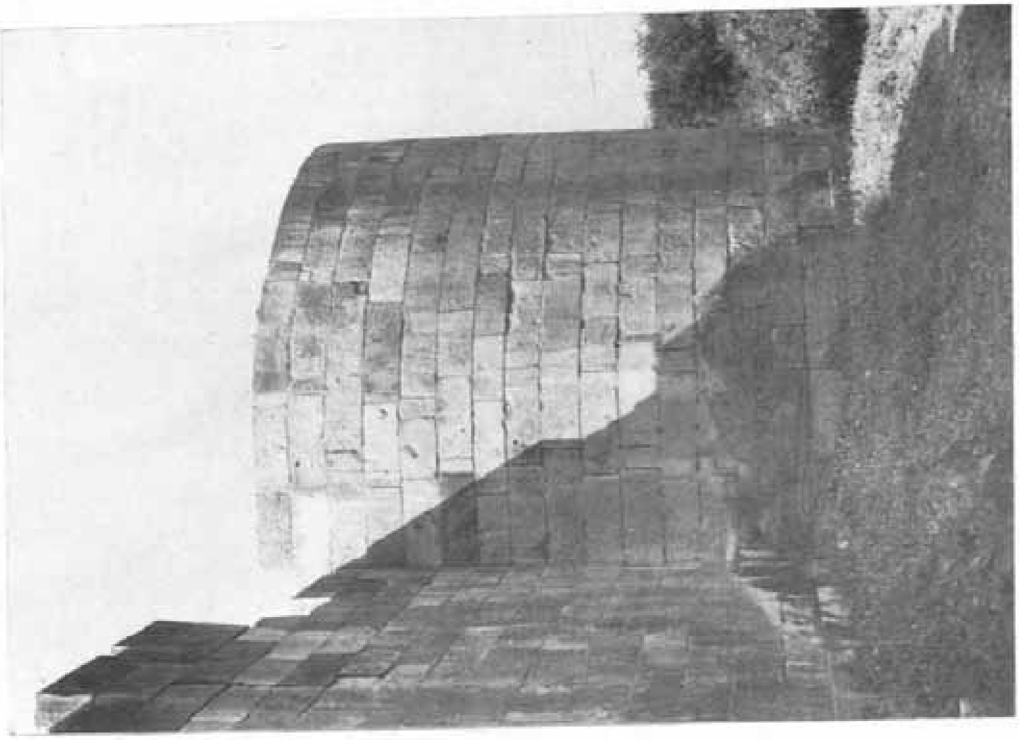


B

Modhera : Surya Kund, A, before B, after repairs of the western wall. See p. 188

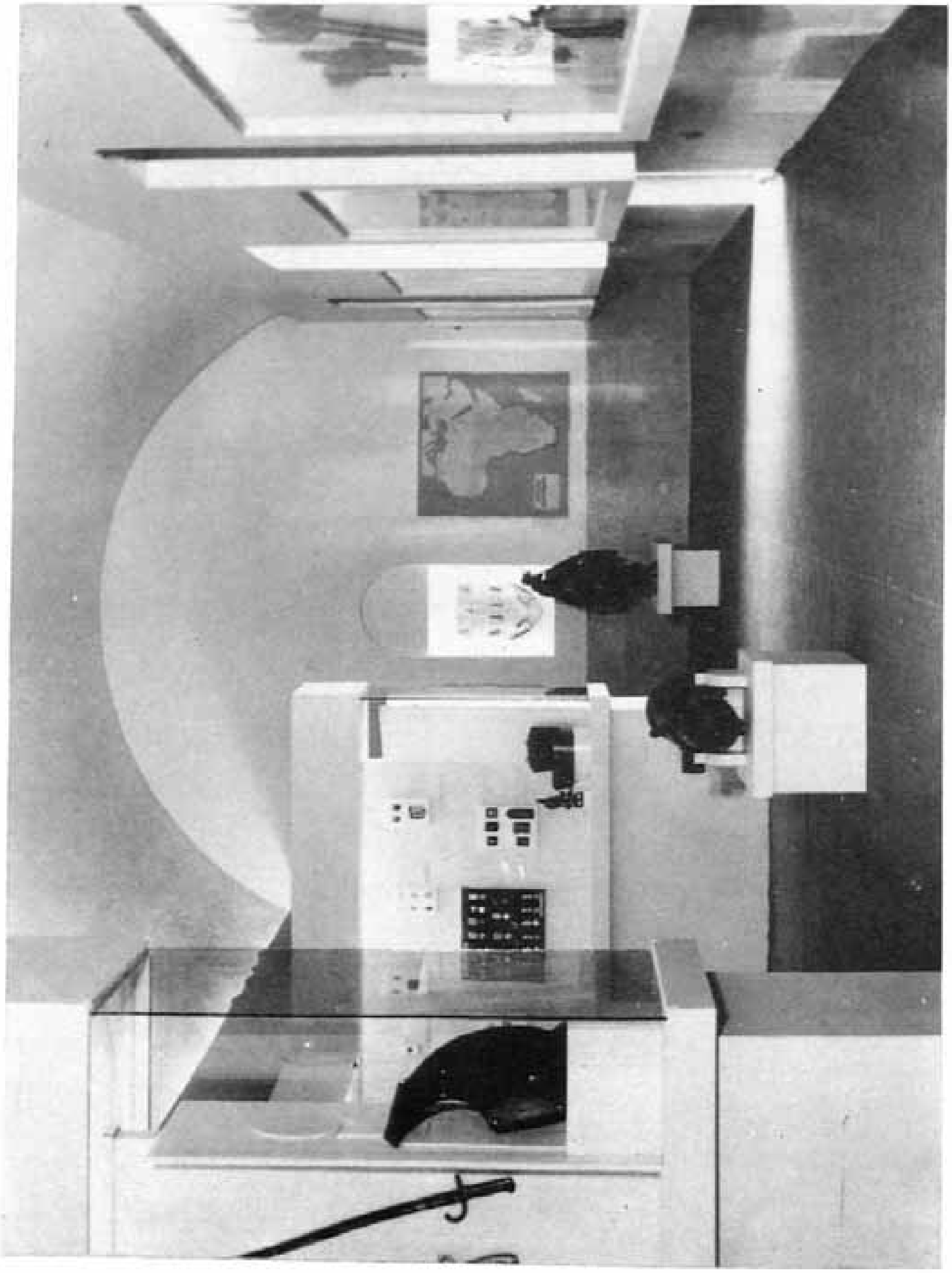


A

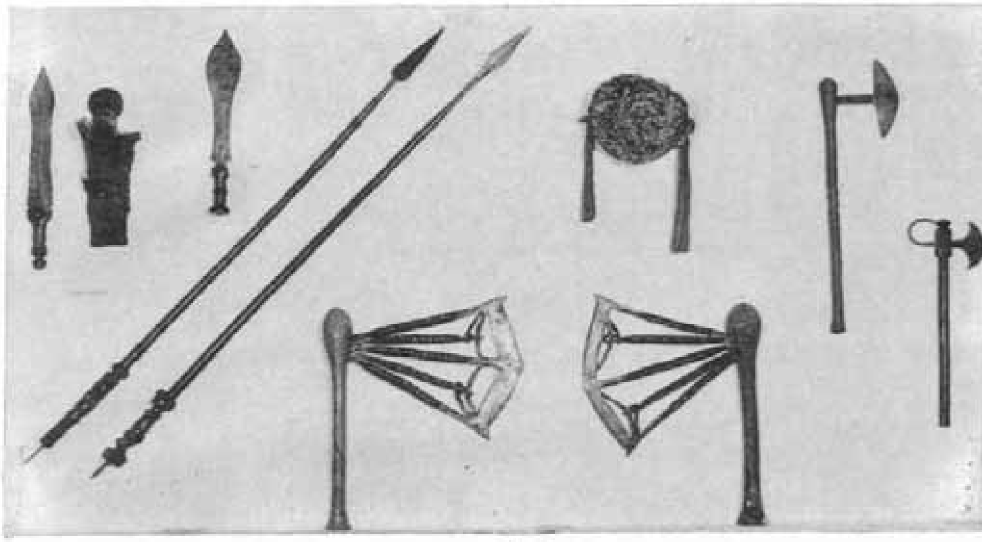


B

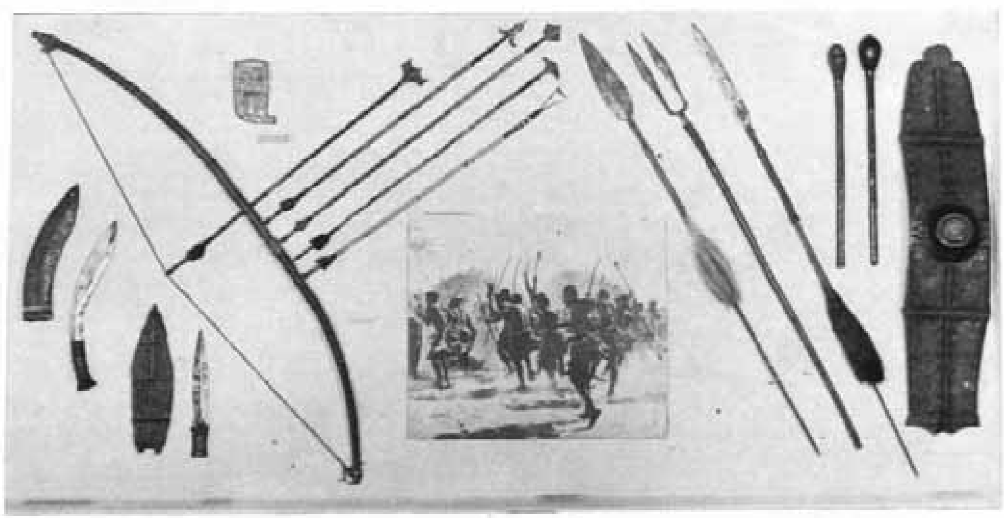
Pavagadh : fort wall, A, before and B, after conservation of north-east portion of wall. *See p. 188*



Central Armed Forces Museum, Luanda (Angola): view of Prehistory and Portuguese gallery. See p. 193

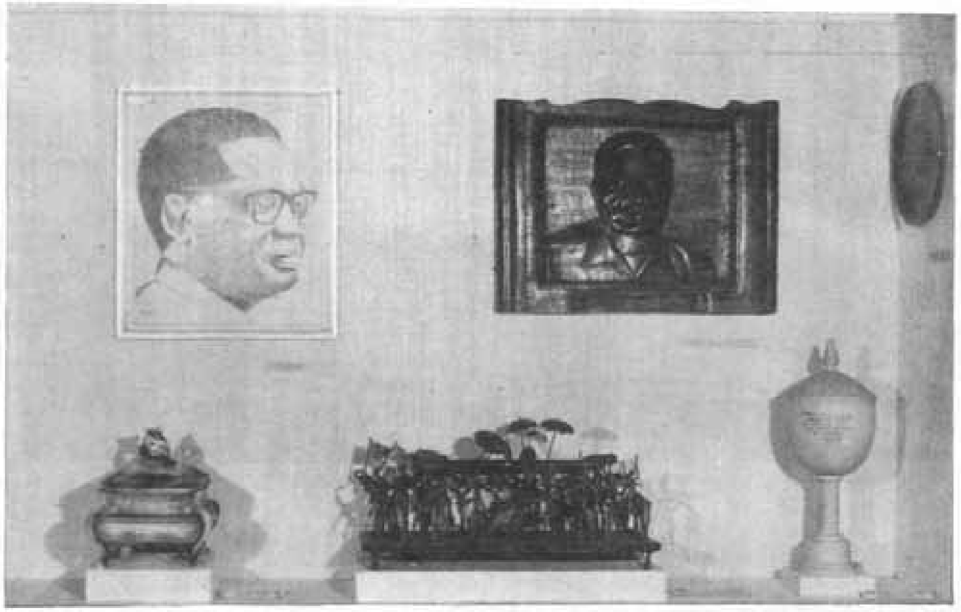


A



B

Central Armed Forces Museum, Luanda (Angola) : arms and armaments displayed in Prehistory and Portuguese gallery. See p. 153

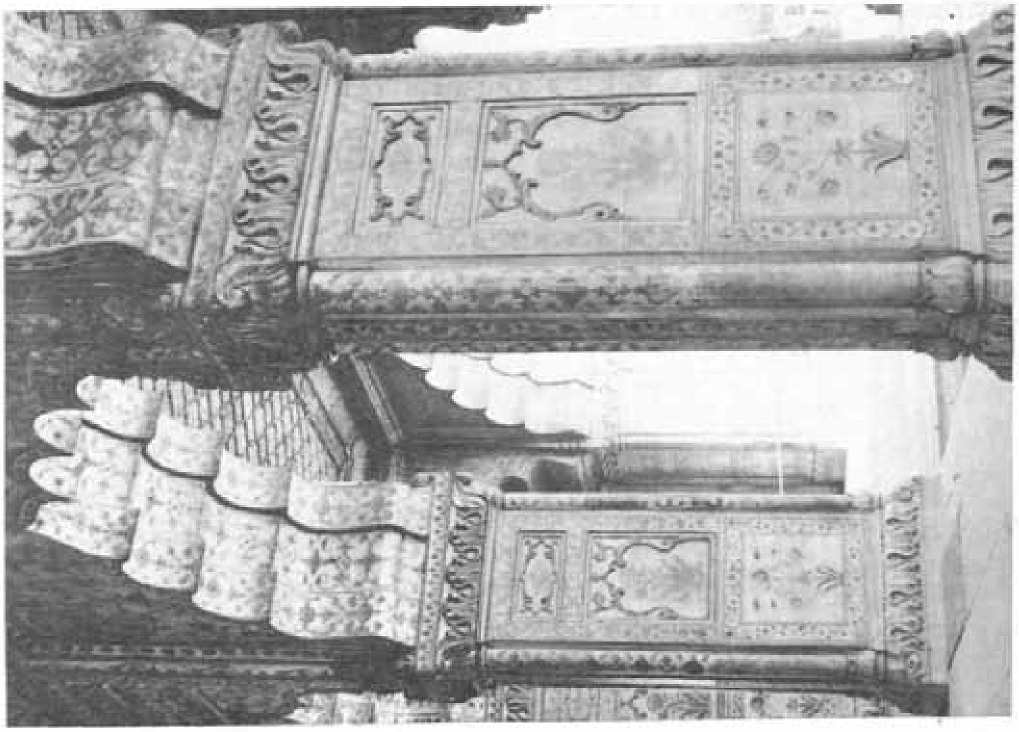


A

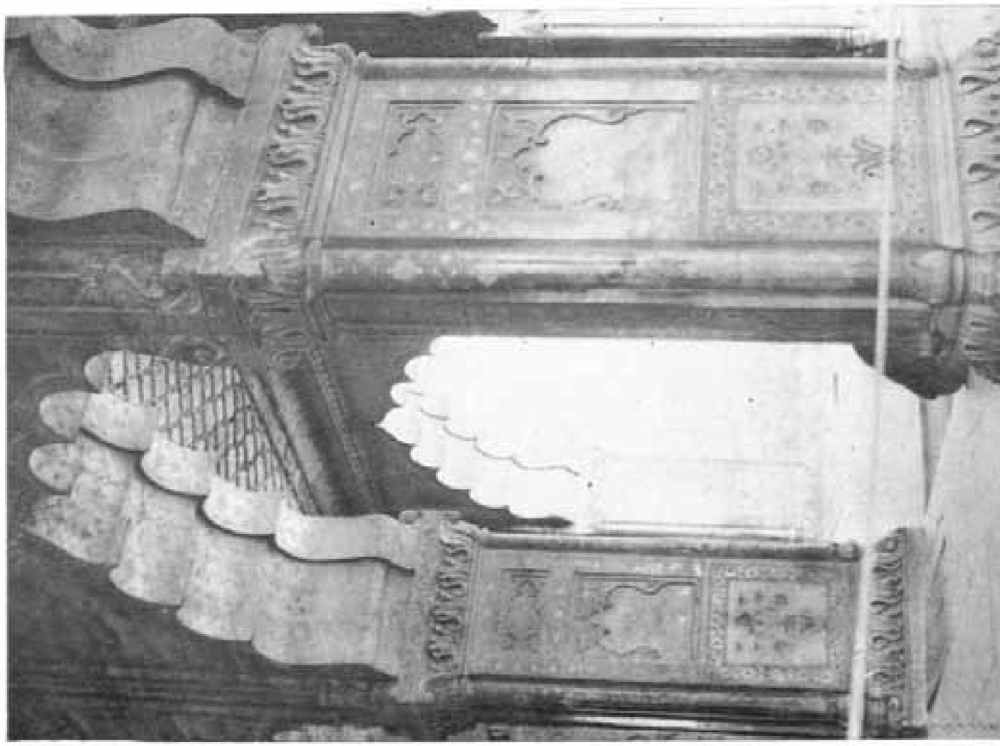


B

Central Armed Forces Museum, Luanda (Angola): view of Comrade Agostinho Neto gallery. See p. 193

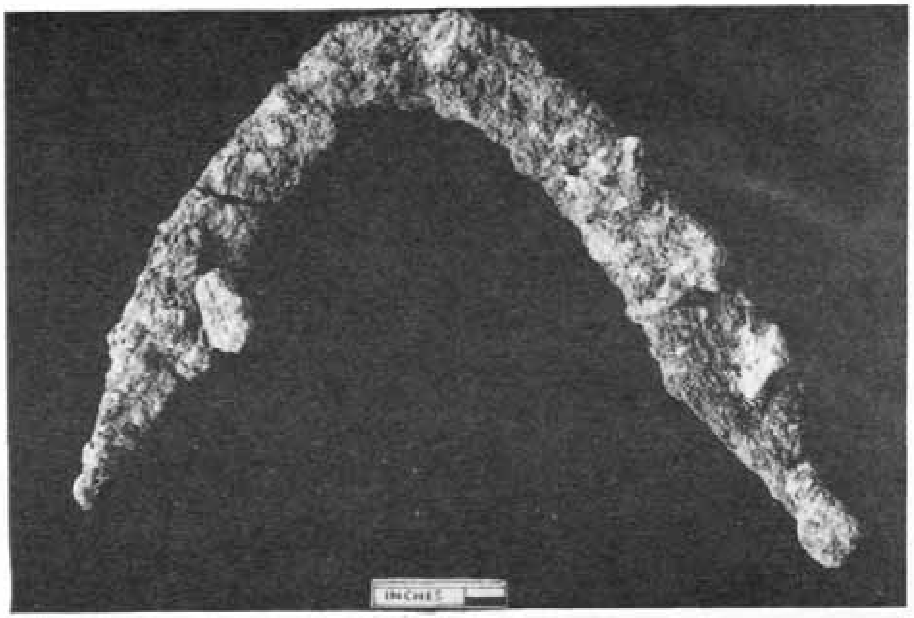


B

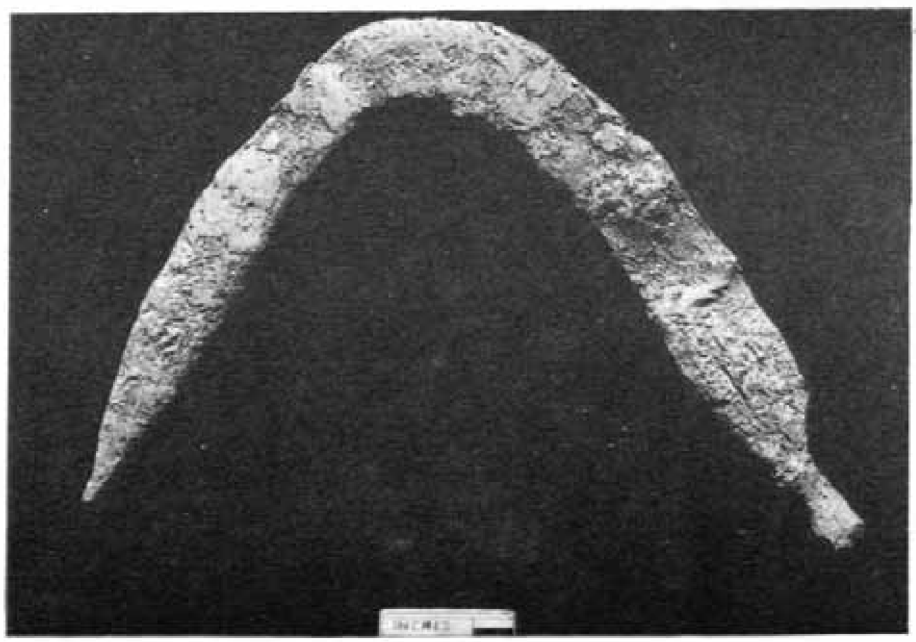


A

Red Fort, Delhi : A, before and B, after chemical treatment of ornamental designs and inlay works of Diwan-i-Khas. See p. 200



A



B

Jakhera excavation : iron object, A, before and B, after chemical treatment. See p. 208